July 14, 1997

NOTE TO: NRC Document Control Desk
Mail Stop 0-5-D-24

FROM: Virgil Curley, Licensing Assistant
Operating Licensing Branch, R I

SUBJECT: OPERATOR LICENSING EXAMINATION ADMINISTERED ON April 28 1997. AT Beaver Valley II.
DOCKET #50-412

The week of 4/28/97 Operator Licensing Examinations were administered at the referenced facility. Attached, you will find the following information for processing through NUDOCS and distribution to the NRC staff, including the NRC PDR:

Item #1 - a) Facility submitted outline and initial exam submittal, designated for distribution under RIDS Code A070.

b) As given operating examination, designated for distribution under RIDS Code A070.

~~Item #2 - Examination Report with the as given written examination attached, designated for distribution under RIDS Code IE42.~~

To: Paul Bissett - USNRC

From: Rich Brooks, Duquesne Light Co.

Date: March 27, 1997

Subject: Beaver Valley Power Station, Unit 2 - Initial Exam Materials.

The following materials are being submitted to you for review, comment, and approval for the BVPS Unit 2 NRC Initial License Examination scheduled for the week of April 28, 1997.

This submittal is in accordance with the instructions in Revision 7, Supplement 1, of NUREG-1021, "Operator Licensing Examiner Standards," Revision 5, of NUREG-BR-1022, "Examiners Handbook for Developing Operator Licensing Written Examinations," and associated "Voluntary Pilot Examination Program Guidelines."

1. Integrated Examination Outline (rev. 1)
2. Written Exam (107 Questions)
3. Written Exam Reference Package Index.
4. Operating Test Drills (4)
5. Operating Test JPMs (18)
6. Exam Materials History

We request that these materials be withheld from public disclosure until after the completion of the examination.

If you have any questions or require further information please contact me at 412-393-5755.

1/1

A070

Exam Materials History

Written Exam Questions

1. 107 Questions are submitted, 7 additional questions are to be used as replacements if necessary. The Outline delineates which sections of the exam have extra questions.

2. Breakdown of questions:

    - 79 New
    - 08 Modified
    - 30 from the LOT Exam bank.
        - Question # 1 used on exam for 2 students 6/96
        - Question # 2 used on exam for 4 students 6/96
        - Question # 3 used on exam for ALL students 3/96
        - Question # 5 used on exam for 2 students 10/95
        - Question # 7 used on exam for 2 students 6/96
        - Question # 8 used on exam for 2 students 10/95
        - Question # 63 used on exam for 2 students 10/95

        The remaining 23 LOT Exam bank questions were not used for this class of operators.

3. The specific information regarding this history is identified on each question after the 2-97-XX number on the question in the lower right hand corner. (ex. M-0125 identifies the question as a Modified version of LOT exam bank question # 125, New, simply means entirely New.)

Drills

All four Drills are entirely New.

JPMs

All 18 JPMs are New, 4 are Time Critical and 2 are Faulted. Refer to the exam outline for specifics on which JPMs will be used for the Instants vs Upgrades.

Exam Outline

The Exam Outline (rev.o) that was sent to you on February 27, 1997 has been revised as follows:

1. The JPM questions were revised to insure ALL questions are higher level.
2. 5 of the original K/A's selected for the written examination have either been deleted or revised.
3. These revisions are designated by Rev bars in the right hand margin of the Outline.

Validation

All of the submitted exam materials have been, or will be validated, by a Licensed operating crew and the exam team.

None of the Written Exam Materials are duplicated on the Independent Audit Examination which will be administered on Mar 31, 1997.

Knowledge and Abilities Record Form
PLANT-WIDE GENERIC RESPONSIBILITIES
PWR - Senior Reactor Operator - 17%
BVPS - Unit 2

Check if included	194001 K/A #	Statement	Rating
✓	K1.01	Knowledge of how to conduct and verify valve lineups.	3.7
✓	K1.02	Knowledge of tagging and clearance procedures.	4.1
✓	K1.03	Knowledge of 10 CFR 20 and related facility radiation control requirements.	3.4
____	K1.04	Knowledge of facility ALARA program.	3.5
____	K1.05	Knowledge of facility requirements for controlling access to vital/control areas.	3.4*
____	K1.06	Knowledge of safety procedures related to rotating equipment.	3.4*
✓	K1.07	Knowledge of safety procedures related to electrical equipment.	3.7*
____	K1.08	Knowledge of safety procedures related to high temperature.	3.4
____	K1.09	Knowledge of safety procedures related to high pressure.	3.4
____	K1.10	Knowledge of safety procedures related to caustic solutions.	3.3
____	K1.11	Knowledge of safety procedures related to chlorine.	3.5*
____	K1.12	Knowledge of safety procedures related to noise.	2.9
____	K1.13	Knowledge of safety procedures related to oxygen-deficient environment.	3.6
____	K1.14	Knowledge of safety procedures related to confined spaces.	3.6
____	K1.15	Knowledge of safety procedures related to hydrogen.	3.8*
____	K1.16	Knowledge of facility protection requirements, including fire brigade and portable fire-fighting equipment usage.	4.2*
____	K1.17	Knowledge of the equipment rotation schedules and reasoning behind the rotation procedure.	2.5

Knowledge and Abilities Record Form
PLANT-WIDE GENERIC RESPONSIBILITIES
PWR - Senior Reactor Operator (Continued)
BVPS - Unit 2

Check if included	194001 K/A #	Statement	Rating
____	A1.01	Ability to obtain and verify control procedure copy.	3.4
✓	A1.02	Ability to execute procedural steps.	3.9
✓	A1.03	Ability to locate and use procedures and station directives related to shift staffing and activities.	3.4
____	A1.04	Ability to operate the plant phone, paging system, and two-way radio.	3.2
____	A1.05	Ability to make accurate, clear and concise verbal reports.	3.8
____	A1.06	Ability to maintain accurate, clear and concise logs, records, status boards and reports.	3.4
____	A1.07	Ability to obtain and interpret station electrical and mechanical drawings.	3.2
____	A1.08	Ability to obtain and interpret station reference material such as graphs, monographs, and tables which contain system performance data.	3.1
____	A1.09	Ability to coordinate personnel activities inside the control room.	3.9*
____	A1.10	Ability to coordinate personnel activities outside the control room.	3.9*
____	A1.11	Ability to direct personnel activities inside the control room.	4.1*
____	A1.12	Ability to direct personnel activities outside the control room.	4.1*
✓	A1.13	Ability to locate control room switches, controls, and indications, and to determine that they are correctly reflecting the desired plant lineup.	4.1
____	A1.14	Ability to maintain primary and secondary plant chemistry within allowable limits.	2.9

Knowledge and Abilities Record Form
PLANT-WIDE GENERIC RESPONSIBILITIES
PWR - Senior Reactor Operator (Continued)
BVPS - Unit 2

Check if included	194001 K/A #	Statement	Rating
_____	A1.15	Ability to use plant computer to obtain and evaluate parametric information on system and component status.	3.4
✓	A1.16	Ability to take actions called for in the Facility Emergency Plan, including (if required) supporting or acting as the Emergency Coordinator.	4.4*

Knowledge and Abilities Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator - 40%
BVPS - Unit 2

Plant Specific Priorities

System #	K/A #	K/A Topic	Rating
3.01 004.	010.A4.03	Ability to manually operate and/or monitor in the control room: Boration/dilution.	3.7

Group I Plant Systems - 19%

001	Control Rod Drive System	025	Ice Condenser System (N/A BVPS)
003	Reactor Coolant Pump System	056	Condensate System
004	Chemical and Volume Control System	059	Main Feedwater System
013	ESF Actuation System	061	Auxiliary/Emergency Feedwater System
014	Rod Position Indication System	063	DC Electrical Distribution System
015	Nuclear Instrumentation System	068	Liquid Radwaste System
017	In-Core Temperature Monitor System	071	Waste Gas Disposal System
022	Containment Cooling System	072	Area Radiation Monitoring System

System #	K/A #	K/A Topic	Rating
3.01 001.	050.K4.01	Knowledge of CRDS design feature(s) and/or interlocks(s) which provide for the following: Rod motion inhibit.	3.4/3.8
3.01 004.	010.A4.03	Ability to manually operate and/or monitor in the control room: Boration/dilution.	3.9/3.7
3.01 004.	020.A1.08	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CVCS controls including: Letdown and charging flows.	3.0/3.0
3.01 014.	000.K1.01	Knowledge of the physical connections and/or cause-effect relationships between the RPIS and the following systems: CRDS.	3.2/3.6
3.01 014.	000.A4.04	Ability to manually operate and/or monitor in the control room: Rezeroing of rod position prior to startup.	2.7/2.7
3.02 013.	000.A4.02	Ability to manually operate and/or monitor in the control room: Reset of ESFAS channels.	4.3/4.4
3.02 013.	000.G14	Abiiity to perform without reference to procedures those actions that require immediate operation of system components or controls. (ESFAS)	4.2/4.2
3.04 003.	000.K5.01	Knowledge of the following theoretical concepts as they apply to the RCPS: The relationship between RCPS flow rate and the nuclear reactor core operating parameters (quadrant power tilt, imbalance, DNB rate, local power density, difference in loop T-hot pressure).	3.3/3.9
3.04 003.	000.K6.04	Knowledge of the applicable performance and design attributes of the following RCPS components: Containment isolation valves affecting RCP operation.	2.8/3.1

Group I Plant Systems - (Continued)

System #	K/A #	K/A Topic	Rating
3.05 056.	000.K1.03	Knowledge of the physical connections and/or cause-effect relationships between the condensate system and the following systems: MFW.	2.6/2.6
3.05 059.	000.A2.11	Ability to (a) predict the impacts of the following malfunctions or operations of the MFW system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of feedwater control system.	3.0/3.3
3.05 061.	000.A2.07	Ability to (a) predict the impacts of the following malfunctions or operations of the AFW system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Air or MOV failure.	3.4/3.5
3.06 022.	000.K3.02	Knowledge of the effect that a loss of the CCS will have on the following: Containment instrumentation readings.	3.0/3.3
3.06 026.	000.K2.02	Knowledge of bus power supplies to the following: MOVs. (QSS)	2.7/2.9
3.07 063.	000.K3.01	Knowledge of the effect that a loss of the dc electrical system will have on the following: ED/G.	3.7/4.1
3.09 015.	000.K6.04	Knowledge of the applicable performance and design attributes of the following NIS components: Bistables and logic circuits.	3.1/3.2
3.09 017.	020.K5.01	Knowledge of the following theoretical concepts as they apply to the ITM system: Temperature at which cladding and fuel melt.	3.1/3.9
3.09 072.	000.K1.04	Knowledge of the physical connections and/or cause-effect relationships between the ARM system and the following systems: Control room ventilation.	3.3/3.5
3.11 068.	000.A3.02	Ability to monitor automatic operation of the LRWS system, including: Automatic isolation.	3.6/3.6
3.11 071.	000.K4.01	Knowledge of WGDS design feature(s) and/or interlocks(s) which provide for the following: Pressure capability of the waste gas decay tank.	2.6/3.0

Knowledge and Abilities Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator - 40%
BVPS - Unit 2

Group II Plant Systems - 17%

002	Reactor Coolant System	035	Steam Generator System
006	Emergency Core Cooling System	039	Main and Reheat Steam System
010	Pressurizer Pressure Control System	055	Condenser Air Removal System
011	Pressurizer Level Control System	062	AC Electrical Distribution System
012	Reactor Protection System	064	Emergency Diesel Generator System
016	Non-Nuclear Instrumentation System	073	Process Radiation Monitoring System
027	Containment Iodine Removal System	075	Circulating Water System
028	H2 Recombiner and Purge Control System	079	Station Air System
029	Containment Purge System	086	Fire Protection System
033	Spent Fuel Pool Cooling System	103	Containment System
034	Fuel Handling Equipment System		

System #	K/A #	K/A Topic	Rating
3.02 002.	000.K4.10	Knowledge of RCS design feature(s) and/or interlocks(s) which provide for the following: Overpressure protection.	4.2/4.4
3.02 006.	000.G10	Ability to explain and apply all system limits and precautions. (ECCS)	3.4/3.7
3.02 011.	000.K5.15	Knowledge of the following theoretical concepts as they apply to the PZR LCS: PZR level indication when RCS is saturated.	3.6/4.0
3.03 010.	000.K6.01	Knowledge of the applicable performance and design attributes of the following PZR PCS components: Pressure detection systems.	2.7/3.1
3.04 035.	010.K5.01	Knowledge of the following theoretical concepts as they apply to the S/GS: Effect of secondary parameters, pressure, and temperature on reactivity.	3.4/3.9
3.05 039.	000.A2.05	Ability to (a) predict the impacts of the following malfunctions or operations of the MRSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Increasing steam demand, its relationship to increases in reactor power.	3.3/3.6
3.05 055.	N/A	N/A	N/A
3.06 027.	N/A	N/A	N/A
3.06 028.	000.A4.03	Ability to manually operate and/or monitor in the control room: Location and operation of hydrogen sampling and analysis of containment atmosphere, including alarms and indications.	3.1/3.3
3.06 103.	000.K3.02	Knowledge of the effect that a loss of the containment system will have on the following: Loss of containment integrity under normal operations.	3.8/4.2
3.07 062.	000.K4.03	Knowledge of ac distribution system design feature(s) and/or interlocks(s) which provide for the following: Interlocks between automatic bus transfer and breakers.	2.8/3.1

Group II Plant Systems - (Continued)

System #	K/A #	K/A Topic	Rating
3.07 064.	000.K4.11	Knowledge of EDG system design feature(s) and/or interlocks(s) which provide for the following: Automatic load sequencer: safeguards.	3.5/4.0
3.08 079.	N/A	N/A	N/A
3.09 012.	000.K1.01	Knowledge of the physical connections and/or cause-effect relationships between the RPS and the following systems: 120V vital/instrument power system.	3.4/3.7
3.09 016.	000.A3.01	Ability to monitor automatic operation of the NNIS, including: Automatic selection of NNIS inputs to control systems.	2.9/2.9
3.09 073.	000.A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRM system including: Radiation levels.	3.2/3.5
3.10 075.	000.K4.01	Knowledge of circulating water system design feature(s) and/or interlocks(s) which provide for the following: Heat Sink.	2.5/2.8
3.11 029.	000.G11	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications. (Containment Purge System)	2.8/3.5
3.11 033.	000.K4.01	Knowledge of SFPCS design feature(s) and/or interlocks(s) which provide for the following: Maintenance of spent fuel level.	2.9/3.2
3.11 034..	000.K6.01	Knowledge of the applicable performance and design attributes of the following FHES components: Fuel handling equipment.	2.1/3.0
3.11 086.	000.A4.02	Ability to manually operate and/or monitor in the control room: Fire detection panels.	3.5/3.5

Knowledge and Abilities Record Form
PLANT SYSTEMS
PWR - Senior Reactor Operator - 40%
BVPS - Unit 2

Group III Plant Systems - 4%

005	Residual Heat Removal System	041	Steam Dump System
007	Pzr Relief Tank/Quench Tank System	045	Main Turbine Generator
008	Component Cooling System	076	Service Water System
		078	Instrument Air System

System #	K/A #	K/A Topic	Rating
3.04 005.	000.K5.05	Knowledge of the following theoretical concepts as they apply to the RHRS: Plant response during "solid plant": pressure change due to the relative incompressibility of water.	2.7/3.1
3.05 041.	020.A4.08	Ability to manually operate and/or monitor in the control room: Steam dump valves.	3.0/3.1
3.05 045.	050.K1.01	Knowledge of the physical connections and/or cause-effect relationships between the MT/G system and the following systems: Protection system.	3.4/3.6
3.05 076.	000.G05	Knowledge of the Limiting conditions for operations and safety limits. (SWS)	2.8/3.2
3.06 007.	N/A	N/A	N/A
3.08 078.	N/A	N/A	N/A
3.10 008.	000.K3.01	Knowledge of the effect that a loss of the CCWS will have on the following: Loads cooled by CCWS.	3.4/3.5

Knowledge and Abilities Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Senior Reactor Operator - 43%
BVPS - Unit 2

Plant Specific Priorities

System #	K/A #	K/A Topic	Rating
		NONE	

Group I Emergency and Abnormal Plant Evolutions - 24%

000001	Continuous Rod Withdrawal	000051	Loss of Condenser Vacuum
000003	Dropped Control Rod	000055	Loss of Offsite and Onsite Power
000005	Inoperable/Stuck Control Rod	000057	Loss of Vital AC Electrical Inst. Bus
000011	Large Break LOCA	000059	Accidental Liquid Rad-Waste Release
000015	RCP Motor Malfunction	000067	Plant Fire on Site
000024	Emergency Boration	000068	Control Room Evacuation
000026	Loss of Component Cooling Water	000069	Loss of Containment Integrity
000029	Anticipated Transient Without Scram	000074	Inadequate Core Cooling
000040	Steam Line Rupture	000076	High Reactor Coolant Activity

EA #	K/A #	K/A Topic	Rating
3.01.000.001	EK1.06	Knowledge of the following theoretical concepts as they apply to the Continuous Rod Withdrawal emergency task: Relationship of reactivity and reactor power to rod movement.	4.0/4.2
3.01.000.003	EA1.02	Ability to operate and monitor the following: Controls and components necessary to recover rod.	3.6/3.4
3.01.000.003	G03	Knowledge of limiting conditions for operations and safety limits. (Dropped Rod)	3.3/3.8
3.01.000.005	EA2.01	Ability to determine or interpret: Stuck or inoperable rod from in-core and ex-core NIS, in-core or loop temperature measurements.	3.3/4.1
3.01.000.024	EK3.01	Knowledge of the bases or reasons for the following: When emergency boration is required.	4.1/4.4
3.01.000.029	EK2.06	Knowledge of the following components: Breakers, relays, and disconnects.	2.9/3.1
3.01.000.029	EK3.12	Knowledge of the bases or reasons for the following: Actions contained in EOP for ATWS.	4.4/4.7
3.03.000.011	EA1.11	Ability to operate and monitor the following: Long term cooling of core. (LBLOCA)	4.2/4.2
3.03.000.011	G12	Ability to utilize symptom based procedures. (LBLOCA)	4.0/4.1

Knowledge and Abilities Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Senior Reactor Operator - 43%
BVPS - Unit 2

Group I Emergency and Abnormal Plant Evolutions - (Continued)

EA #	K/A #	K/A Topic	Rating
3.04.000.015	EK2.07	Knowledge of the following components: RCP seals.	2.9/2.9
3.04.000.015	EA2.10	Ability to determine or interpret: When to secure RCPs on loss of cooling or seal injection.	3.7/3.7
3.04.000.074	EK1.01	Knowledge of the following theoretical concepts as they apply to the inadequate core cooling emergency task: Methods of calculating subcooling margin.	4.3/4.7
3.05.000.040	EK1.06	Knowledge of the following theoretical concepts as they apply to the steam line rupture emergency task: High-energy steam line break considerations.	3.7/3.8
3.05.000.040	EA2.01	Ability to determine or interpret: Occurrence and location of a steam line rupture from pressure and flow locations.	4.2/4.7
3.05.000.051	EK3.01	Knowledge of the bases or reasons for the following: Loss of steam dump capability upon loss of condenser vacuum.	2.8/3.1
3.06.000.069	G08	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for technical specifications. (Loss of Containment Integrity)	3.4/4.1
3.07.000.055	EK3.02	Knowledge of the bases or reasons for the following: Actions contained in EOP for loss of offsite and onsite power.	4.3/4.6
3.07.000.055	EA1.01	Ability to operate and monitor the following: In-core thermocouple temperatures. (During LOPA)	3.7/3.9
3.07.000.057	EA1.06	Ability to operate and monitor the following: Manual control of components for which automatic control is lost. (LO Vital 120 vac bus)	3.5/3.5
3.07.000.057	EA2.19	Ability to determine or interpret: The plant automatic actions that will occur on the loss of a vital ac electrical instrument bus.	4.0/4.3
3.08.000.068	EK2.01	Knowledge of the following components: Auxiliary shutdown panel layout.	3.9/4.0
3.10.000.026	EA2.02	Ability to determine or interpret: The cause of possible CCW loss.	2.9/3.6
3.11.000.059	EK3.01	Knowledge of the bases or reasons for the following: Termination of a release of radioactive liquid.	3.5/3.9
3.11.000.067	G05	Knowledge of the annunciator alarms and indications, and use of the response instructions. (Fire on site)	3.4/3.8
3.11.000.076	G04	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits. (High RCS Activity)	2.1/3.7

Knowledge and Abilities Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Senior Reactor Operator - 43%
BVPS - Unit 2

Group II Emergency and Abnormal Plant Evolutions - 16%

000007	Reactor Trip	000037	Steam Generator Tube Leak
000008	Pzr Vapor Space Accident	000038	Steam Generator Tube Rupture
000009	Small Break LOCA	000054	Loss of Main Feedwater
000022	Loss of Reactor Coolant Makeup	000058	Loss of DC Power
000025	Loss of Residual Heat Removal System	000060	Accidental Gaseous-Waste Release
000027	Pzr Pressure Control System Malfunction	000061	Area RMS Alarms
000032	Loss of Source Range NIS	000065	Loss of Instrument Air
000033	Loss of Intermediate Range NIS		

EA #	K/A #	K/A Topic	Rating
3.01.000.007	EK1.03	Knowledge of the following theoretical concepts as they apply to the reactor trip emergency task: Reasons for closing the main turbine governor valve and main turbine stop valve after a reactor trip.	3.7/4.0
3.02.000.022	EK3.07	Knowledge of the bases or reasons for the following: Isolating charging. (LO RCS Make-up)	3.0/3.2
3.03.000.008	EK3.02	Knowledge of the bases or reasons for the following: Why PORV or code safety exit temperature is below RCS or PZR temperature.	3.6/4.1
3.03.000.009	EK3.21	Knowledge of the bases or reasons for the following: Actions contained in EOP for small break LOCA/leak.	4.2/4.5
3.03.000.009	EA2.34	Ability to determine or interpret: Conditions for throttling or stopping HPI. (SBLOCA)	3.6/4.2
3.03.000.027	EA2.16	Ability to determine or interpret: Actions to be taken if PZR pressure instrument fails low.	3.6/3.9
3.03.000.027	G03	Knowledge of limiting conditions for operations and safety limits. (PZR PCS)	3.1/3.6
3.03.000.037	EA2.12	Ability to determine or interpret: Flow rate of leak. (SG Tube Leak)	3.3/4.1
3.03.000.038	EK3.06	Knowledge of the bases or reasons for the following: Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures.	4.2/4.5
3.03.000.038	EA1.39	Ability to operate and monitor the following: Drawing S/G into the RCS, using the "feed and bleed" method. (SGTR)	3.6/3.7
3.04.000.025	EA1.09	Ability to operate and monitor the following: LPI pump switches, ammeter, discharge pressure gauge, flow meter, and indicators.	3.2/3.1
3.05.000.054	EK1.01	Knowledge of the following theoretical concepts as they apply to the loss of MFW emergency task: MFW line break depressurizes the S/G (similar to a steam line break).	4.1/4.3

Group II Emergency and Abnormal Plant Evolutions - (Continued)

EA #	K/A #	K/A Topic	Rating
3.07.000.058	EA2.03	Ability to determine or interpret: DC loads lost; impact on ability to operate and monitor plant systems.	3.5/3.9
3.08.000.065	EK3.04	Knowledge of the bases or reasons for the following: Cross-over to backup air supplies.	3.0/3.2
3.09.000.032	EA1.01	Ability to operate and monitor the following: Manual restoration of power. (LO SR NIS)	3.1/3.4
3.09.000.033	G08	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for technical specifications. (LO IR NIS)	2.8/3.4
3.09.000.061	EK3.02	Knowledge of the bases or reasons for the following: Guidance contained in alarm response for ARM system.	3.4/3.6
3.11.000.060	EA2.05	Ability to determine or interpret: That the automatic safety actions have occurred as a result of a high ARM system signal.	3.7/4.2

Knowledge and Abilities Record Form
EMERGENCY PLANT EVOLUTIONS
PWR - Senior Reactor Operator - 43%
BVPS - Unit 2

Group III Emergency and Abnormal Plant Evolutions - 3%

000028 PZR Level Malfunction
000036 Fuel Handling Incident
000056 Loss of Offsite Power

EA #	K/A #	K/A Topic	Rating
3.02.000.028	EK1.01	Knowledge of the following theoretical concepts as they apply to the PZR level malfunction emergency task: PZR reference leak abnormalities.	2.8/3.1
3.02.000.028	EA2.02	Ability to determine or interpret: PZR level as a function of power level or T-ave including interpretation of malfunction. (PZR level malfunction)	3.4/3.8
3.07.000.056	EA2.50	Ability to determine or interpret: That load and VAR limits, alarm setpoints, frequency and voltage limits for ED/Gs are not being exceeded.	2.8/3.1
3.11.000.036	EA1.04	Ability to operate and monitor the following: Fuel handling equipment during an incident.	3.1/3.7

Examination Level (Circle One): RO / SRO Facility: Beaver Valley - Unit 2 Week of Examination: Examiner's Name (print):		
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification	JPM: Review RCS Leak Rate Calculation
	Operating Logs	JPM: Maintain Operator Logs
A.2	Tagging and Clearances	JPM: Verify Clearance
A.3	Radiation Work Permits	JPM: Exit the RCA
A.4	Emergency Event Classification	JPM: Event Classification

Examiner: _____ Chief Examiner: _____

Examination Level (Circle One): RO / SRO(I) / SRO(U) Facility: Beaver Valley Unit Two Week of Examination: Examiner's Name (print):		
System / JPM	Safety Function	Planned Follow-up Questions: K/A/G // Importance // Description
1. AFW - Initiate Feedwater to Hot Dry Steam Generator	V	a. 061 000 G13 3.6/3.8 Feeding hot dry steam generator
		b. 061 000 A2.04 3.4/3.8 Inoperable AFW pump
2. PRT - Respond to PRT High Pressure	VI	a. 007 000 A4.10 3.6/3.8 Indications of Leaking PORV or Safety
		b. 007 000 K1.03 3.0/3.2 PRT response to SI
3. NIS - Perform QPTR Alarm Test	IX	a. 015 000 K4.01 3.1/3.3 SR Block/Reset
		b. 015 000 K1.01 4.1/4.2 NI Control Power
4. SWS - Shutdown Standby Service Water System	V	a. 076 000 K1.19 3.6/3.9 CIB affect on service water
		b. 076 000 A2.02 2.7/3.1 Service Water Pump Trip
5. RHR - Perform RHR Valve Test	IV	a. 005 000 K1.04 2.9/3.1 RHR - CVCS Interface
		b. 005 000 K4.03 2.9/3.2 RHR System Flow Control
6. Press Cont - Depressurize RCS During N/C	III Faulted	a. 011 000 A1.01 3.5/3.6 Pressurizer Level Control during N/C cooldown
		b. 011 000 A1.02 3.3/3.5 Control of void growth during N/C cooldown
7. ECCS - SI Termination	II Faulted	a. 006 000 K4.05 4.3/4.4 Automatic HHSI Pump start
		b. 006 020 K4.09 3.8/41 ECCS Valve Interlocks
8. AC Dist. - Electrical Distribution Recovery.	VII Emergency	a. 062 000 K1.03 3.5/4.0 Loss of DC Control Power
		b. 064 000 K4.02 3.9/4.2 EDG Auto Trip
9. CVCS - Perform Boric Acid Pump Recirculation Test	I RCA Entry	a. 004 010 K6.09 4.4/4.6 Emergency Boration
		b. 004 000 A4.04 3.2/3.6 Boron Reactivity Calculation
10. Inst. Air - Place Bypass Filters in Service.	VIII	a. 078 000 K1.04 2.6/2.9 Cooling Water to CNMT Instrument Air Compressors
		b. 078 000 K3.02 3.4/3.6 Loss of Station Instrument Air

Examiner: _____ Chief Examiner: _____

Examination Level (Circle One): RO / SRO(I) / SRO(U) Facility: Beaver Valley Unit Two Week of Examination: Examiner's Name (print):		
System / JPM	Safety Function	Planned Follow-up Questions: K/A/G // Importance // Description
1. NIS - Perform QPTR Alarm Test	IX	a. 015 000 K4.01 3.1/3.3 SR Block Reset
		b. 015 000 K1.01 4.1/4.2 NI Control Power
2. SWS - Shutdown Standby Service Water System	V	a. 076 000 K1.19 3.6/3.9 CIB affect on service water
		b. 076 000 A2.02 2.7/3.1 Service Water Pump Trip
3. Press Cont - Depressurize RCS During N/C	III Faulted	a. 011 000 A1.01 3.5/3.6 Pressurizer Level Control during N/C cooldown
		b. 011 000 A1.02 3.3/3.5 Control of void growth during N/C cooldow
4. AC Dist. - Electrical Distribution Recovery.	VII Emergency	a. 062 000 K1.03 3.5/4.0 Loss of DC Control Power
		b. 064 000 K4.02 3.9/4.2 EDG Auto Trip
5. CVCS - Perform Boric Acid Pump Recirculation Test	I RCA Entry	a. 004 010 K6.09 4.4/4.6 Emergency Boration
		b. 004 000 A4.04 3.2/3.6 Boron Reactivity Calculation
6.		
7.		
8.		
9.		
10.		

Examiner: _____ Chief Examiner: _____

Simulation Facility: Scenario No.: 97-1

Beaver Valley Power Station - Unit 2

Examiners: Applicants:

Initial Conditions:

100% power, BOL, equilibrium conditions.

Turnover:

1. 2CHS*P21A, the A - charging pump, is on clearance for outboard motor bearing replacement and will not be returned for at least 24 hours.
2. 2FWE*P23A, the A - motor driven AFW pump, is on clearance for breaker cubicle repairs and will not be returned for at least 10 hours.
3. Identified primary to secondary leak of 160 gpd on 21A S/G. (MALF RCS4A) Management directs a plant shutdown at 25%/hr.

Event No.	Malf. No.	Event Type*	Event Description
1	CLF XMT RCS19	I	2RCS*LT459, pzr level transmitter, fails low, causing letdown isolation. Crew removes channel from service IAW 2OM-6.4.IF.
2		N	Restore normal letdown.
3		R	Power reduction of at least 5%.
4	CLF VLV CFW38	C	2FWS*FCV498, 21C S/G feed reg valve fails as is, requiring a Rx trip.
5	LEAK CFW1 NODE32	M	On the Rx trip, a feed break inside containment occurs on the B S/G that is not isolable from the S/G. E-0... ES-0.1... E-0... E-2... E-1... ES-1.1
6	MALF PPL5A	C	Auto SI fails to actuate on Train A of SSPS.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Examiner: _____

Chief Examiner: _____

U2LOTDRL97-1(ic)REV0

INITIAL CONDITIONS: Drill File 831, IC-31
Reactor power = 100%, RCS boron - 932 ppm, CBD = 227 steps

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
Set CBD step counters = 227	2SVS*PCV101A - YCT	Fig. 7-1A: 2CHS*25 closed
BOL ΔI curve in RO operator aids	2SVS*HCV104 - YCT	Fig. 24-3: 2FWE*37 closed
2SVS*PCV101A controller setpoint = 100%	2CHS*P21A - RDT	Fig, 21-2: 2MSS*15, 2SVS*27 closed
2CHS*P21A - PTL	2MSS*SOV105F - YCT	(Note: Erase marks at end of session)
2FWE*P23A - PTL	2FWE*P23A - RDT	
2MSS*SOV120 Open		
2MSS*SOV105F Open		

EQUIPMENT STATUS	DATE/TIME OOS	T/S
2CHS*P21A	12 hours prior to start	3.5.2 (Info only)
2FWE*P23A	8 hours prior to start	3.7.1.2 72/6/6 HSBY/HSDN
160 gpd tube leak in A SG; 1.5E-4 μC/ml gross activity, 3.0E-6 μC/ml I^{133}	1 hour prior to start	3.4.6.2, 3.7.1.4 (Info Only)

SHIFT TURNOVER INFORMATION

1. Plant is at 100% power, BOL conditions. RCS boron = 932 ppm, CBD = 227 steps.
2. Per GMNO and AOP-2.6.4 direction, a normal plant at 25% per hour is to be performed, using 2OM-52.4.B and C, as a result of the A SG tube leakage.
3. 2CHS*P21A on clearance for outboard motor bearing replacement.
4. 2FWE*P23A on clearance for breaker cubicle repairs (ACB-2E18).
5. AOP 2.6.4 in effect, 2MSS*15 and 2SVS*27 shut, TDAFW SOV's aligned for A SG tube leak. Auxiliary steam has been transferred to Unit 1 main steam per 1/2OM-27.4A.B. SG blowdown has been isolated to minimize secondary contamination, per Chemistry recommendation.

SCENARIO SUPPORT MATERIAL REQUIRED

1/2OM-48.1.C(ISS3) Figure 48.1.C-2 (ANSS Turnover Checklist)
2OM-54.2.S1 Log S1-2 (NSS Operating Report)
2OM-54.2.S1 Log S1-5 (NCO Report)
2OM-54.2.S1 Log S1-17 (Shift Operating Report-ANSS)
2OM-52.4.B (Load Following)

U2LOTDRL97-1(1)REV0

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Select Drill 831, initialize IC set 31, and establish initial plant conditions.	Reactor plant at 100% power, BOL conditions. Preparations for plant shutdown due to SG tube leakage are in progress. RCS boron = 932 ppm, CBD = 227 steps.		
Insert IC commands:			
LOA HIV49 1,0,D	2CHS*P21A ACB 2E12 racked out.		
LOA CHS4 0,0,0,D	2CHS*25 shut.		
LOA HIV55 1,0,D	2FWE*P23A ACB 2E18 racked out.		
LOA AFW2 0,0,0,D	2FWE*37 shut.		
MAL RCS4A ACT,0.1111,0,0,0,D	160 gpd tube leak in A SG.		
LOA MSS9 0,0,0,D	2SVS*27 closed.		
LOA AFW25 0,0,0,D	2MSS*15 closed.		
Assign shift positions:			
ANSS _____ RO _____ PO _____ STA _____	Simulator Frozen until after shift turnover unless it needs to be run momentarily for an alignment change.		
Conduct a shift turnover with the oncoming operators.			Oncoming ANSS should complete the required checklist and carry out a formal shift turnover.
When the shift turnover is complete, place the simulator to RUN and commence the drill.	Simulator running.		Crew assumes control.

U2LOTDRL97-1(2)REV0

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1 PRZR level transmitter failure Insert: XMT RCS19 1,0,0,0,D	2RCS*LT459 fails low. PRZR level deviation and control level low alarms. 2CHS*AOV200A,B,C shut. 2CHS*LCV460A shut. 2CHS*FCV122 opens. PRZR heaters off. A4-1B, L0491D A4-1C, L0493D A4-1G, Y0486D		RO recognizes problem with PRZR level channel, informs ANSS. Crew refers to ARPs as necessary, then 2OM-6.4.IF Attachment 1. RO informs ANSS that 2RCS*LT459 failed low. ANSS directs operator to defeat 2RCS*LT459 control function with PRZR level selector switch. RO informs ANSS that Channels 460 and 461 are selected. Crew ensures adequate VCT makeup, proper PRZR heater operation, and proper charging flow control.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #2 Establish normal letdown.			Crew establishes letdown per 2OM-6.4.IF.
	2CHS*LCV460A open. Appropriate 2CHS*AOV200s open. 2CHS*PCV145 in auto.		RO informs the ANSS that letdown has been reestablished.
			Crew refers to Tech. Spec. 3.3.1.1, 3.3.3.5, and 3.3.3.8, directs crew to trip appropriate bistable within six hours.
When directed to trip bistable per 2MSP-6.23-I, insert: LOA PCS1 T,0,D BST PCS97 1,0,D	Rack RK*2PRI-PROC-1 door open. 2LS/459A-1 (442,BS-1) high level trip.		
LOA PCS1 F,0,D	Rack C1 door closed.		
Inform control room that B/S is tripped.			ANSS notifies I&C of level transmitter problem.
After normal letdown is reestablished and bistables are directed to be tripped. insert: LEAK CFW,1,32,1500,0,0,C,JPPLRT(1)	1500 gpm B SG feed break upon reactor trip.		
MAL PPL5A ACT,1,0,0,D VLV CFW38 1,0,D	Train A auto SI actuation failure. MFRV 2FWS*FCV498 fails as is.		
Then continue with scenario.			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #3			
Continue plant shutdown, power reduction of > 5%.	Turbine load and reactor power dropping.		Crew continues normal power reduction per 2OM-52.4.C.
EVENT #4			
MFRV failed as is during load reduction.	As plant shutdown progresses, C SG level rises due to feed/steam flow mismatch. Level deviation alarm A6-11E may actuate if level exceeds 5% above setpoint.		Crew notes C SG feed flow is higher than steam flow.
			Crew makes conservative decision to manually trip the reactor and isolate MFRV 2FWS*FCV498.
			RO manually trips the reactor.
EVENT #5			
B SG feed break upon reactor trip.			
			RO and PO commence immediate actions of E-0, ANSS refers to E-0 to verify immediate actions.
E-0 steps 1 to 7 are immediate actions.	Turbine trip due to reactor trip alarm A5-6D lit. Rod bottom lights lit. Neutron flux dropping.		RO verifies reactor trip.
			RO sounds standby alarm, announces Unit 2 reactor trip.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			EPP evaluation to be performed later.
	Throttle or governor valves closed, reheat stops or interceptors closed.		PO verifies turbine trip.
	MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
	Main generator output breakers open. Exciter circuit breaker open.		PO verifies generator trip.
	2AE and 2DF busses energized.		PO verifies power to AC emergency busses.
An automatic Train B SI actuation due to high CNMT pressure will occur approximately 3 mins. after feedwater leak initiation.	SI not actuated. PRZR pressure > 1845 psig but dropping. CNMT pressure < 1.5 psig but rising. SG steam pressure > 500 psig but dropping.		RO checks if SI is actuated or required.
Monitor crew progress during temporary ES-0.1 transition. If transition was made, E-0 steps 1-7 should be reperformed.			ANSS makes transition to ES-0.1 (if applicable), then returns to E-0 upon manual SI actuation.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #6			
Train A SI automatic initiation failure.	SI signal on low PRZR pressure, Train A SI components not aligned for SI, status annun. A12-1D alarms intermittently.		Crew checks if SI is actuated, recognizes Train A SI auto actuation failure, manually actuates both trains of SI.
Immediate actions complete.	Both EDGs running.		PO verifies diesel generators running.
	2FWE*P23B running, P23A OOS. 2MSS*SOV105A-F open. 2FWE*HCV100A-F full open.		PO verifies AFW status.
	Two SWS pumps running. Service water header pressure 60-124 psig.		RO verifies service water system in service.
	HHSI pumps running HHSI flow indicated. LHSI pumps running. All valve indicating lights with red SIS marks lit.		RO/PO verify SI status.
Adverse CNMT conditions exist when CNMT pressure > 1.5 psig.	CIA actuated, all indicating lights with orange CIA marks lit.		RO/PO verify CIA.
	FWI actuated, all indicating lights with green FWI marks lit.		RO/PO verify feedwater isolation.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	CNMT pressure > 3 psig (time dependent) SLI actuated, all indicating lights with yellow marks lit.		RO/PO checks if main steamline isolation required.
If CIB has not actuated when step 15 is addressed, monitor crew response when actuation occurs (approximately 10 mins. after leak initiation).	Alarm A1-2H lit (time dependent). CNMT pressure peaked at 8 psig, dropping with spray actuation. CIB actuated, all indicating lights with blue CIB marks lit.		RO/PO check CIB/spray status.
	RCPs stopped.		RO stops all RCPs.
Report satisfactory U1 actuation when requested.			Crew requests Unit 1 CREBAPS verification.
	2CCS-AOV118 opened. One station air compressor running.		PO establishes filtered water cooling to station air compressors.
	CCP pumps stopped due to CIB.		RO or PO verifies CCP in service.
	SR channels aligned properly.		PO verifies SR detector high voltage switches in nor[illegible].
	AFW flow > 365 gpm.		PO verifies total AFW flow greater than 365 gpm.
Crew may isolate AFW flow to B SG completely if diagnosis of fault is made.	RCS temperature < 547°F and dropping. SLI previously actuated. AFW flow throttled.		RO checks RCS temperature stable at or trending to 547°F.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			ANSS directs available personnel to perform emergency safety function checklists.
Crew should ensure RSS pumps do not cavitate after start.	Recirc spray pumps running after time delay.		RO checks recirc spray pump status.
	PORVs closed (not leaking). Spray valves closed. Safeties closed (PSMS data). PRT conditions normal for conditions.		RO checks PRZR isolated.
	RCPs previously stopped.		RO checks if RCPs should be stopped.
	B SG pressure dropping.		PO checks if any SGs are faulted.
			ANSS makes transition to E-2, and informs crew.
			ANSS directs STA to monitor status trees.
			Unusual Event due to an unplanned depressurization of the main steam system resulting in RCS cooldown and SI (TAB 2.10.
	All discharge lights lit. Control room dampers closed.		PO verifies control room habitability.
	All yellow SLI marks lit.		PO verifies steam line isolation.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Note: A and C SG pressures may be dropping due to effects of B SG fault, but should not be diagnosed as faulted.	A and C SG pressures stable.		PO checks for any non-faulted SG.
	B SG pressure dropping uncontrollably.		PO identifies faulted SG.
	CNMT iso. vlv. 2FWS*HYV157B closed. MFRV 2FWS*FCV488 closed. BFRV 2FWS*FCV489 closed. AFW throttle valves 2FWE*HCV100C and D closed.		Crew isolates faulted SG.
	2FWE*P23B running. 2FWE*P22 tripped from BB-C.		PO checks at least one MDAFW pump running, trips TDAFW pump. Crew dispatches an operator to locally close TDAFW supply valve 2MSS*16.
When directed to close 2MSS*16, insert: LOA AFW26 0,90,0,D	2MSS*16 closed over 90 sec. ramp.		
If directed to reset 2FWE*TTV22, insert: LOA AFW22 0,0,D	TDAFW pump trip throttle valve reset.		
Then report valve closed/TTV reset.			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Atmospheric dump valve 2SVS*PCV101B closed. RHR vlv. 2SVS*HCV104 closed.		
When directed to close 2SVS*28, insert: LOA MSS10,0,0,0,D Then report valve closed.	RHR iso vlv 2SVS*28 open. SG blowdown valve. 2BDG*AOV100B1 closed. Blowdown sample valves 2SSR*AOV117A,B,C closed. Steamline drain valve 2SDS*AOV111B1 closed. RHR piping drain valve 2SDS*AOV129A closed.		Crew dispatches an operator to locally close 2SVS*28.
	No SG levels rising in an uncontrolled manner.		Crew checks if SG tubes are intact.
			ANSS makes transition to E-1, informs crew.
	Control room habitability system is activated.		PO rechecks control room habitability.
	RCPs stopped.		RO checks if RCPs should be stopped.
	Recirc spray pumps running (after time delay).		RO rechecks recirc spray pump status.
	CNMT sample amber lights lit.		RO verifies both H2 analyzers running.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	B SG previously diagnosed as faulted and isolated (pending reports of local operator actions).		PO checks if any SG is faulted.
	365 gpm minimum feed flow until SG NR levels > 5[33]%.		PO checks and maintains intact SG levels 5[33]% to 50%.
	PORV's closed, block valves energized and open.		RO checks PORVs and block valves.
	Subcooling > 41[59]°. Secondary heat sink sufficient. RCS pressure stable or rising. PRZR level > 4[42]%.		RO/PO check if SI can be terminated.
			ANSS makes transition to ES-1.1, informs crew.

Terminate scenario upon transition to ES-1.1 (SI Termination).

Simulation Facility: Scenario No.: 97-2

Beaver Valley Power Station - Unit 2

Examiners: Applicants:

Initial Conditions:

100% power, MOL, equilibrium conditions.

Turnover:

1. 2CHS*P21A, the A - charging pump, is on clearance for outboard motor bearing replacement and will not be returned for at least 24 hours.
2. 2FWE*P23A, the A - motor driven AFW pump, is on clearance for breaker cubicle repairs and will not be returned for at least 10 hours.

Event No.	Malf. No.	Event Type*	Event Description
1		N	Perform control rod assembly partial movement surveillance test for D control bank rods.
2		R	Perform control rod assembly partial movement surveillance test for D control bank rods.
3	CLF XMT NIS9	I	N42 upper detector fails to minimum.
4	MALF RCS 2A	M	3000 gpm SB LOCA ramped in over 10 minutes.
5	CLF PMP CHS2	C	On Rx trip/SI, the B HHSI pump fails to start.
6	CLF PMP CHS2	C	After crew trips RCP's in E-0, the C HHSI pump trips on overcurrent. E-0... E-1...ES-1.2... possibly FR-C.2.
7			B HHSI pump / HHSI flow restored.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Examiner: _____

Chief Examiner: _____

U2LOTDRL97-2(ic)REV0

INITIAL CONDITIONS: Drill File 832, IC-32
Reactor power = 100%, RCS boron - 732 ppm, CBD = 227 steps

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
Set CBD step counters = 227	2CHS*P21A - RDT	Fig. 7-1A: 2CHS*25 closed
Place MOL ΔI curve in RO operator aids	2FWE*P23A - RDT	Fig. 24-3: 2FWE*37 closed
2CHS*P21A - PTL		(Note: Erase marks at end of session)
2FWE*P23A - PTL		

EQUIPMENT STATUS	DATE/TIME OOS	T/S
2CHS*P21A	12 hours prior to start	3.5.2 (Info only)
2FWE*P23A	8 hours prior to start	3.7.1.2 72/6/6 HSBY/HSDN

SHIFT TURNOVER INFORMATION
1. Plant is at 100% power, equilibrium BOL conditions, RCS boron = 732 ppm, CBD = 227 steps.
2. 2CHS*P21A on clearance for outboard motor bearing replacement.
3. 2FWE*P23A on clearance for breaker cubicle repairs (ACB-2E18).
4. Maintain steady-state operations.
5. Control rod assembly partial movement test 2OST-1.1 is to be completed this shift (performance was suspended due to shift manning problem on previous shift). The OST has been completed satisfactorily to part G (test control bank D); parts G and H (test completion) are to be performed.

SCENARIO SUPPORT MATERIAL REQUIRED
1/2OM-48.1.C(ISS3) Figure 48.1.C-2 (ANSS Turnover Checklist)
2OM-54.2.S1 Log S1-2 (NSS Operating Report)
2OM-54.2.S1 Log S1-5 (NCO Report)
2OM-54.2.S1 Log S1-17 (Shift Operating Report-ANSS)
2OST-1.1 (Control Rod Assembly Partial Movement Test)

U2LOTDRL97-2(1)REV0

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Select Drill 832, initialize IC set 32, and establish initial plant conditions.	Reactor plant at 100% power, MOL equilibrium conditions. RCS boron = 732 ppm, CBD = 227 steps.		
Insert IC commands: LOA HIV49 1,0,D LOA CHS4 0,0,0,D LOA HIV55 1,0,D LOA AFW2 0,0,0,D	 2CHS*P21A ACB 2E12 racked out. 2CHS*25 shut. 2FWE*P23A ACB 2E18 racked out. 2FWE*37 shut.		
Assign shift positions: ANSS _____ RO _____ PO _____ STA _____	Simulator Frozen until after shift turnover unless it needs to be run momentarily for an alignment change.		
Conduct a shift turnover with the oncoming operators.			Oncoming ANSS should complete the required checklist and carry out a formal shift turnover.
When the shift turnover is complete, place the simulator to RUN and commence the drill.	Simulator running.		Crew assumes control.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1 & 2 Control rod assembly partial movement test. Direct crew to perform 2OST-1.1, control rod assembly partial movement test, part G (CBD test).			RO continues performance of OST.
EVENT #3 Power range channel detector failure. Insert: XMT NIS9 1,0,0,0,D	PR Channel N-42 upper detector fails low. N42 full power indications drop to approximately 51%. NIS PR upper section flux deviation and comparator deviation alarms. NIS PR flux rate high alarm. AFD out of target band alarm A4-5H, Y0136D A4-4F, Y0130D A4-4G, N0026D A4-6D, Y4677D (computer calc)		RO acknowledges alarms, reviews indications, diagnoses N42 problem, informs ANSS. Crew refers to AOP 2.2.1C (may not refer to ARPs if diagnosis is previously made) and performs actions for single PR channel malfunction in Mode 1.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Bistables tripped.		Crew removes control power fuses from N42 drawer A.
	Rod stop bypass switch - N42. Upper and lower section defeat switches -N42. Comparator channel defeat switch - N42.		Operator defeats N42 at NIS rack.
When directed by crew, insert the following to trip bistables: LOA PCS2 T,0,D BST PCS158 1,0,D BST PCS159 1,0,D LOA PCS2 F,0,D	Protection rack C2 door open. 2TS/422C-1 (421, BS-3) OTDT trip. 2TS/422C-2 (421, BS-4) OTDT rod stop). Protection rack C2 door closed.		Crew directs plant operator to trip bistable per AOP 2.2.1C Attachment 1.
			Crew refers to Tech. Spec. 3.3.1.1 in conjunction with AOP performance, ensure N42 bistables are tripped, control power fuses removed, and shows intent to comply with QPTR requirements. Crew restricts power to less than 75% and reduces PR high flux trip setpoint to 85% within 4 hours, or monitor QPTR via MIDS every 12 hours.
After the AOP is completed, continue with Event #4			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #4 SBLOCA. Insert: PMP CHS2 2,0,D PMP CHS3 3,20,C,ORCP21B.LT.0.7 MAL RCS2A ACT,3000,600,0,0,D	2CHS*P21B fails to start 2CHS*P21C trips 20 secs. after RCP 2RCS*P21B is tripped. SBLOCA on RCS A loop cold leg. PRZR level and pressure rapidly drop. CNMT pressure, temperature, and humidity rise. Automatic reactor trip and SI due to low PRZR pressure, or manual reactor trip.		RO/PO recognize degrading RCS and CNMT conditions, inform ANSS.
Crew should perform a manual reactor trip as a conservative action.			RO informs ANSS of trip/SI actuation.
			RO and PO commence E-0 immediate actions, ANSS references E-0 to verify immediate actions.
E-0 steps 1 - 7 are immediate actions.	Turbine trip due to reactor trip alarm A5-6D lit. Rod bottom lights lit. Neutron flux dropping.		RO verifies reactor trip.
			RO sounds standby alarm, announces Unit 2 reactor trip and SI.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			EPP evaluation to be performed later.
	Throttle or governor valves closed. Reheat stops or interceptors closed.		PO verifies turbine trip.
	MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
	Main generator output breakers open. Exciter circuit breaker open.		PO verifies generator trip.
	Both emergency busses energized.		PO verifies power to AC emergency busses.
	Low PRZR pressure alarm A5-4G lit. SI actuation status light A12-1C lit.		RO checks if SI is actuated.
Immediate actions complete.	EDGs running.		PO verifies EDGs running.
	2FWE*23A OOS, P23B and P22 running. 2MSS*SOV105A-F open. 2FWE*HCV100A-E full open.		PO verifies AFW status.
	Two SWS pumps running. Header pressure 60-124 psig.		RO verifies service water system in service.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #5 HHSI pump start failure.	2CHS*P21C running (until RCPs are secured), 2CHS*P21B not running and will not start. HHSI flow indicated. LHSI pumps running. All indicating lights with red SIS marks lit.		Crew verifies SI status; RO informs ANSS that 2CHS*P21B is not running. Crew attempts a manual start of 2CHS*P21B.
Note: Adverse CNMT conditions exist when CNMT pressure > 1.5 psig.	All indicating lights with orange CIA marks lit.		Crew verifies CIA.
	All indicating lights with green FWI marks lit.		Crew verifies feedwater isolation.
When requested, report status of charging/HHSI pumps; 2CHS*P21C has tripped on OC, 2CHS*P21B has no indication of failure to start.	CNMT pressure rising; if > 3 psig, all yellow SLI marks lit.		Crew checks if steamline isolation is required.
Crew should contact Electrical Maintenance and/or Ops management to facilitate troubleshooting and repair of 2CHS*P21B; as support groups, inform crew that ACB 2F12 has a broken contactor bracket; suggest swapping ACBs to render HHSI pump operable.	Alarm A1-5H not lit. CNMT pressure < 8 psig.		Crew checks CIB/spray status.
	2CCS-AOV118 open. One station air compressor running.		PO establishes filtered water system cooling to the station air compressors.
	CCP pumps running until CIB occurs.		PO verifies CCP in service.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Switches in normal position.		PO verifies SR HV switches in normal.
	AFW flow > 365 gpm.		PO verifies total AFW flow > 365 gpm.
	RCS temperature < 547°F and dropping. SLI previously actuated.		RO checks RCS temperature stable at or trending to 547°F.
			Available personnel performs ESF checklists.
	RSS pumps running after time delay (if CIB actuated).		RO checks recirc spray pump status.
	PORVs closed (not leaking). PRZR spray valves closed. Safeties closed (PSMS data). PRT conditions consistent with expected values.		RO checks PRZR isolated.
Note: RCPs may be secured per LHP trip criteria prior to addressing this step.	RCPs running. HHSI flow indicated on 2SIS-FI943. RCS to highest SG D/P < 145 psid. RCPs manually tripped.		RO checks if RCPs should be stopped; stops all RCPs.
EVENT #6 HHSI pump trip / loss of HHSI flow (after RCPs are secured).	No SG pressure dropping uncontrollably or completely depressurized.		PO checks if any SGs are faulted.
	Secondary DRMS channels consistent with pre-event values.		Crew checks if SG tubes are intact.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	CNMT pressure, sump level, and radiation degraded.		Crew checks CNMT conditions.
			ANSS makes transition to E-1, informs crew.
			Alert due to an RCS leak causing an SI and direct entry into E-1 (TAB 1.2.3 Potential Loss).
			STA commences CSF status tree monitoring.
Report U1 actuation when requested.	CIB actuated. Compressed air tank discharge lights lit. Outside air intake and exhaust dampers closed.		Crew checks control room habitability.
	RCPs stopped.		RO checks if RCPs should be stopped.
	RSS pumps running after time delay.		RO checks recirc spray pump status.
	CNMT sample amber lights lit.		RO verifies both CNMT H2 analyzers running.
	No SG pressure dropping uncontrollably or completely depressurized.		PO checks if any SGs are faulted.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	SG NR levels < 5[33%], AFW flow maintained > 365 gpm until > 5[33%] in at least one SG.		PO checks intact SG levels.
EVENT #7 Restoration of HHSI flow. Anytime prior to addressing E-1 step 14 (check if LHSI pumps should be stopped), report as Electrical Maintenance / N.O. that 2CHS*P21B ACB 2F12 has been swapped, tested, racked in, and is fully operable. Insert: PMP CHS2 CLR 0	2CHS*P21B start failure cleared, pump is operable.		Crew acknowledges report from maintenance / operator, places 2CHS*P21B in service.
	Power available to 2RCS*MOV536 and MOV537. MOV535 deenergized open. PORVs closed (not leaking). All 3 MOV block valves open.		RO checks PRZR PORVs and block valves.
	RCS subcooling < 41[59]°F. AFW flow > 365 gpm. RCS pressure dropping. PRZR level < 4%.		Crew checks if SI flow can be terminated.
	No SG level rising uncontrollably. Secondary radiation consistent with pre-event levels.		Crew checks if SG tubes are intact.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	QSS or RSS pumps running. CNMT pressure > -2 psig.		RO checks if CNMT spray should be stopped.
	2CVS-P21A,B in PTL. 2DAS-P204A,B in stop. 2DGS-P21A,B in PTL.		RO isolates CNMT vents and drains.
	Status light A12-1C lit. A12-1D dark.		RO resets both trains of SI.
			RO resets both trains of CIA.
	RCS pressure > 185 psig but dropping.		RO checks if LHSI pumps should be stopped.
	All SG pressures stable.		PO checks SG pressures.
	RCS pressure dropping.		RO checks RCS pressure.
	2AE and 2DF busses energized from offsite, both EDGs secured.		PO checks if EDGs should be stopped.
			PO stops 2-1 EDG.
	Train A components have power available.		Crew verifies cold leg recirc capability per Attachment A-0.6.
	Aux building and safeguards radiation consistent with pre-event values.		Crew checks PAB and safeguards radiation.
			Crew addresses sample and equipment steps (E-1 steps 17 and 18).

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	RCS pressure > 185 psig.		ANSS determines method of cooldown for long-term recovery, makes transition to ES-1.2.
			RO checks RWST level > 460 in.
	ESF reset actions previously performed.		Crew addresses CNMT vents and drains isolation, SI, and CIA/CIB reset steps.
	All 4KV busses energized from offsite.		PO verifies all 4KV busses energized by offsite power.
	Actions dependent on RCS pressure response.		RO checks if LHSI pumps should be stopped.
	Both station air and both CNMT air compressors energized.		PO verifies power available to station and CNMT instrument air compressors.
			Crew notifies Health Physics and Chemistry, requests samples as requested by TSC.
	Filtered water previously aligned, one air compressor running.		PO checks station air status.
	2IAC-MOV131 and 2IAC*MOV130 opened, CNMT air pressure > 85 psig.		PO establishes instrument air to CNMT.
	SG levels dependent on previous actions.		PO checks intact SG levels, controls AFW flow to maintain 5[33] to 50%.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Atmospheric dump valves or RHR valve used to perform RCS cooldown (MSIVs closed, condenser steam dumps unavailable).		Crew initiates RCS cooldown to cold shutdown.
Terminate scenario after RCS cooldown is initiated per ES-1.2 step 12			

Simulation Facility: Scenario No.: 97-3

Beaver Valley Power Station - Unit 2

Examiners: Applicants:

Initial Conditions:

48% power, EOL, equilibrium conditions.

Turnover:

1. 2CHS*P21A, the A - charging pump, is on clearance for outboard motor bearing replacement and will not be returned for at least 24 hours.
2. 2FWE*P23A, the A - motor driven AFW pump, is on clearance for breaker cubicle repairs and will not be returned for at least 10 hours.

Event No.	Malf. No.	Event Type*	Event Description
1	CLF XMT RCS32	I	2RCS*PT455, pzr pressure transmitter, fails low. Crew removes channel from service IAW 2OM-6.4.IF and TS 3.3.1.1 action 7.
2	MALF RCS4B	C	A 10 gpm S/G tube leak develops on 21B S/G, ramped in over 2 min.
3		N	Power reduction due to S/G tube leak.
4		R	Power reduction of at least 5%.
5	CLF CNH BAT1	C	2CHS* FCV113A, BA FCV fails open during auto make-up or boration, requiring manual FCV control.
6	MALF RCS4B	M	500 gpm SGTR on 21B S/G.
7		C	ATWS on Rx trip signal. Rx trip breakers are opened by field operator at t = 2 minutes after requested. E-0... FR-S.1... E-0... E-3...

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Examiner: _____

Chief Examiner: _____

U2LOTDRL97-3(ic)REV0

INITIAL CONDITIONS: Drill File 833, IC-33
Reactor power = 48%, RCS boron - 318 ppm, CBD = 171 steps

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
Set CBD step counters = 171	2CHS*P21A - RDT	Fig. 7-1A: 2CHS*25 closed
BOL ΔI curve in RO operator aids	2FWE*P23A - RDT	Fig. 24-3: 2FWE*37 closed
2CHS*P21A - PTL		(Note: Erase marks at end of session)
2FWE*P23A - PTL		

EQUIPMENT STATUS	DATE/TIME OOS	T/S
2CHS*P21A	12 hours prior to start	3.5.2 (Info only)
2FWE*P23A	8 hours prior to start	3.7.1.2 72/6/6 HSBY/HSDN

SHIFT TURNOVER INFORMATION

1. Plant is at 48% power, equilibrium EOL conditions, due to System Operator request. RCS boron = 318 ppm, CBD = 171 steps.
2. 2CHS*P21A on clearance for outboard motor bearing replacement.
3. 2FWE*P23A on clearance for breaker cubicle repairs (ACB-2E18).
4. Maintain steady-state operations.

SCENARIO SUPPORT MATERIAL REQUIRED

1/2OM-48.1.C(ISS3) Figure 48.1.C-2 (ANSS Turnover Checklist)
2OM-54.2.S1 Log S1-2 (NSS Operating Report)
2OM-54.2.S1 Log S1-5 (NCO Report)
2OM-54.2.S1 Log S1-17 (Shift Operating Report-ANSS)
2OM-52.4.B (Load Following)

U2LOTDRL97-3(1)REV0

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Select Drill 833, initialize IC set 33, and establish initial plant conditions.	Reactor plant at 48% power, EOL equilibrium conditions. RCS boron = 318 ppm, CBD = 171 steps.		
Insert IC commands: LOA HIV49 1,0,D LOA CHS4 0,0,0,D LOA HIV55 1,0,D LOA AFW2 0,0,0,D	 2CHS*P21A ACB 2E12 racked out. 2CHS*25 shut. 2FWE*P23A ACB 2E18 racked out. 2FWE*37 shut.		
Assign shift positions: ANSS _____ RO _____ PO _____ STA _____	Simulator Frozen until after shift turnover unless it needs to be run momentarily for an alignment change.		
Conduct a shift turnover with the oncoming operators.			Oncoming ANSS should complete the required checklist and carry out a formal shift turnover.
When the shift turnover is complete, place the simulator to RUN and commence the drill.	Simulator running.		Crew assumes control.

U2LOTDRL97-3(2)REV0

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1 PRZR pressure transmitter fails low. Insert: XMT RCS32 1,1700,0,0,D	Pressurizer transmitter 2RCS*PT455 fails low. Annunciators A4-2D,3B and 4B alarm.		RO acknowledges and verifies alarms, and informs ANSS. Crew refers to ARPs A4-2B, 3B and 4B as necessary, then IFP 2OM-6.4.IF Attch. 2. RO informs ANSS that 2RCS*PT455 failed low. ANSS ensures plant is stable Crew refers to T.S. 3.3.1.1, 3.3.2.1, and 3.3.3.5, and complies with applicable actions. Crew refers to instrument failure procedure. ANSS directs I & C to trip the bistables for 2RCS*PT455.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
As I & C use the following to trip bistables per MSP-6.12-I:			
LOA PCS1 T,0,D	Rack RK*2PRI-PROC-1 door open.		
BST PCS117 1,0,D	2PS/455A(428,BS-1) hi press trip.		
BST PCS118 1,0,D	2PS/455B(428,BS-2) P-11		RO monitors bistable tripping.
BST PCS125 1,0,D	2PS/455C(428,BS-4) lo press trip		
BST PCS126 1,0,D	2PS/455D(428,BS-3) lo press SI		ANSS direct I & C to investigate and
BST PCS151 1,0,D	2TS/412C-1(421,BS-3) OTDT trip.		repair 2RCS*PT455.
BST PCS152 1,0,D	2TS/412C-2(421,BS-4) OTDT rod stop.		
BST PCS127 1,0,D	2PS/455G(444,BS-1) PORV block.		
LOA PCS1 F,0,D	Rack C1 door shut.		
Inform the crew that the bistables are tripped.			
Continue with Event #2 after the bistables have been tripped and T.S. addressed.			

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #2 SG tube leak. Insert: MAL RCS4B ACT,10,120,0,0,D	10 gpm tube leak in B SG, over 2 mins. Charging flow rises to compensate, VCT level gradually drops. A steamline radiation monitor 2MSS*RQ101A rises through alert alarm value. Blowdown sample radiation monitor 2SSR-RQ100 rises through alert and high alarm values. Radiation monitor system trouble (A4-5A) and level high (A4-5C) alarms actuate.		RO acknowledges alarms, informs ANSS. Crew refers to ARPs as necessary. Crew checks DRMS console for affected radiation monitor channels. ANSS refers to AOP-2.6.4, crew performs necessary actions. Crew requests Chemistry support (leak rate and isotopic analysis).

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Leakage > 150 gpd.		Crew determines that leak rate value requires a plant shutdown to Mode 3 within 5 hours.
2OST-6.2 does not need to be performed due to the magnitude of leakage.	10 gpm leak > T.S. limit. Activity value pending Chemistry reports.		Crew verifies compliance with T.S. 3.4.6.2 and 3.7.1.4. Also, initiates EPP evaluation.
	Monitors placed in service (2MSS*SOV120 open).		Crew notifies Health Physics, PO checks main steamline radiation monitors available.
			RO adjusts 2SVS*PCV101B controller setpoint to 100%, verifies PCV closed.
			Crew dispatches plant operator to perform local SG isolation actions.
When directed to locally operate valves, insert: LOA AFW26 0,0,0,D LOA AFW22 1,0,D LOA AFW22 0,0,D LOA MSS10 0,0,0,D	2MSS*16 closed. TTV locally closed. TTV locally reset. 2SVS*28 closed.		
	Blowdown isolation valves 2SSR*AOV117A,B,C and 2BDG*AOV100A1,B1,C1 closed (automatic isolation due to high alarm on 2SSR-RQ100).		Crew determines appropriate SG blowdown flowpath.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Crew verifies primary to secondary leak rate > 142 gpd, addresses oil/water separator operations. Crew requests Health Physics assistance.
Commands for transferring auxiliary steam are contained in Drill 198. AOP-2.6.4 complete. As Ops management, direct the crew to perform a plant shutdown at 1% per min.. Prior to crew commencing the load reduction, insert: CNH BAT1 2,0,0,0,D	Boric acid flow control valve 2CHS*FCV113A controller failed to 0% (FCV fully open) demand; manual control remains operable.		Crew may transfer auxiliary steam to Unit 1 or aux. boilers.
EVENT #3 / 4 Load reduction > 5% power. If the crew requests Reactor Engineering support for reactivity planning, acknowledge request and report a 1/2 to 3/4 hour delay to supply a plan; an interim plan (developed by the crew) should be developed and used.			ANSS directs crew to commence a normal plant shutdown, refers to 2OM-52.4.B (Load Following).

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #5 Boric acid control to blender failure.	2CHS*FCV113A remains fully open with controller in auto. Manual control is operable. Boric acid flow deviation alarm A2-2E alarms and does not clear while BA flow is excessively high.		During load reduction, RO performs normal blender boration, recognizes excess boric acid flow with 2CHS*FCV113A in automatic control, informs ANSS. RO operates 2CHS*FCV113A in manual control. Crew reports controller problem to I&C.
EVENT #6 Steam generator tube rupture. Insert all of the following: MAL PPL1A ACT,2,0,0,D MAL PPL1B ACT,2,0,0,D MAL RCS4B ACT,500,0,0,0,D	Auto and manual reactor trip failure (ATWS). 500 gpm SGTR in B SG. PRZR pressure and level drop, B SG level rises/feed flow drops. RMS channels reflect SGTR.		Crew recognizes change in leak rate, diagnoses imminent reactor trip, decides to conservatively perform manual reactor trip.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #7 Failure of auto and manual reactor trip (ATWS).	Reactor fails to auto trip. Manual reactor trip fails.		RO notes that a reactor trip has not occurred, attempts to manually trip the reactor, notes manual attempts fail and reports ATWS condition to the ANSS.
Crew transitions to FR-S.1			Operators commence immediate actions of FR-S.1.
Steps 1 - 5 of FR-S.1 are immediate actions.			
			STA monitors status trees for information only while in FR-S.1.
	Turbine tripped.		PO trips turbine, using both trip pushbuttons.
	Rods inserting.		RO uses auto or manual rod control to insert rods.
	Standby alarm sounded.		RO sounds standby alarm and announces U-2 reactor trip without SCRAM.
	Reactor not tripped.		Crew dispatches an operator to locally trip reactor.
			Site Area Emergency per TAB 2.3 Failure of Reactor Protection.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	All throttle or governor valves closed. All reheat stop or intercept valves closed.		PO verifies turbine trip.
	Condenser steam dumps disabled.		PO closes condenser steam dumps by placing selector switches in off.
	2MSS*MOV100A and B closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
Immediate actions complete. Two minutes after receiving direction to locally open reactor trip breakers, insert: MAL PPL2A ACT,0,0,D MAL PPL2B ACT,0,0,D As dispatched operator, report reactor trip breakers manually opened.	Reactor trip breakers opened. All rods fully inserted.		RO informs ANSS that the reactor tripped.
	2FWE*P23B running. 2FWE*P23A OOS 2MSS*SOV105A-F open. 2FWE*HCV100A-F full open.		PO verifies AFW status.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	One charging pump running. 2CHS*MOV350 open. In service boric acid pump started. Emergency boration flow > 30 gpm indicated. 2CHS*FCV122 open, charging flow > 40 gpm indicated.		RO initiates emergency boration.
	PZR pressure < 2335 PSIG.		RO checks PRZR pressure less than 2335 psig.
If SI actuates during FR-S.1 implementation, the crew will perform this continuous action step.	SI actuation status dependent on plant conditions.		Crew checks SI signal status. ANSS checks if 1st 15 steps of E-0 have been performed.
	AFW flow satisfactory. SG levels trending to 5% NR level.		PO checks SG levels, verifies AFW flow, controls feed flow to maintain 5-50%.
	2CHS*FCV113B closed. 2CHS*FCV114A closed. 2CHS*FCV114B closed.		RO verifies dilution paths isolated.
	Uncontrolled cooldown not in progress.		RO monitors RCS for uncontrolled cooldown.
	PR NIs less than 5%. IR NIs negative SUR.		RO verifies reactor subcritical.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			ANSS makes transition from FR-S.1 to E-0 and informs control room to commence E-0 immediate actions. Operators commence immediate actions of E-0, ANSS refers to E-0 to verify immediate actions.
Steps 1 - 7 of E-0 are immediate actions.	Turbine trip due to reactor trip alarm A5-6D lit. Rod bottom lights lit. Neutron flux dropping.		RO verifies reactor trip.
			RO sounds standby alarm, announces Unit 2 reactor trip and SI (if actuated). EPPevaluation to be performed later.
	Throttle or governor valves closed, reheat stops or interceptors closed.		PO verifies turbine trip.
	MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
	Main generator output breakers open. Exciter circuit breaker open.		PO verifies generator trip.
	2AE and 2DF busses energized.		PO verifies power to AC emergency busses.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Any SI annunciator. SI actuation status light A12-1D lit.		RO checks if SI is actuated or required, manually actuates both trains of SI.
	EDGs running.		PO verifies EDGs running.
	2FWE*P23B running, P23A OOS. 2MSS*SOV105A-F open. 2FWE*HCV100A-F open.		PO verifies AFW status.
	Service water pumps running. Service water header pressure 60 - 124 psig.		RO verifies service water system in service.
	HHSI pumps running. HHSI flow indicated. LHSI pumps running. All indicating lights with red SIS marks lit.		RO/PO verifies SI status.
	All indicating lights with orange CIA marks lit.		RO/PO verify CIA.
	All lights with green FWI marks lit.		RO/PO verify FWI.
	CNMT pressure < 3 psig. Steamline pressure > 500 psig. Steamline pressure rate < 100 psig in 50 seconds.		RO/PO check if main steamline isolation required.
	CIB alarm A1-2H not lit. Containment pressure < 8 psig.		RO checks CIB/spray status.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	2CCP-AOV118 opened. One station air compressor running.		PO establishes filtered water cooling to station air compressors.
	CCP pump running.		RO/PO verify CCP in service.
	SR channels aligned properly.		PO verifies SR detector high voltage switches in normal.
	AFW greater than 365 gpm.		PO verifies AFW flow greater than 365 gpm.
Note: condenser steam dumps are probably disabled due to FR-S.1 actions; crew may place dumps in service for RCS temperature control.	Tavg trending to 547°F.		RO verifies RCS Tavg stable at or trending to 547°.
			ANSS directs personnel to perform emergency safety function checklists.
	Recirc spray pumps not running.		RO checks recirc spray pump status.
	PORVs closed, PRZR spray valves closed, safeties closed (PSMS data). PRT conditions expected for conditions. PORV block valves energized and open.		RO checks PRZR PORVs, spray valves, and safeties.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	B SG level rising uncontrollably. Condenser air ejector vent radiation monitor not consistent with pre-event values.		RO/PO check if SG tubes are intact.
			ANSS makes transition to E-3.
			Alert on Primary to secondary leakage, entry into E-3 (TAB 1.2.4).
	Control room habitability system not required.		Crew checks control room habitability.
	RCS to SG D/P and CCP flow satisfactory.		RO/PO check if RCPs should be stopped.
	2CVS-P21A,B PTL. 2DAS-P204A,B stopped. 2DGS-P21A,B PTL.		RO isolates containment vents and drains system.
	Both trains of SI and CIA reset. CIB not actuated.		RO resets SI, CIA, and CIB.
	Unexpected rise in B SG narrow range level.		Crew identifies B SG as ruptured.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	2SVS*PCV101B controller setpoint adjusted to 100% and valve verified closed. Main steamline and bypass valves 2MSS*AOV101B, 102B closed. RHR valve 2SVS*HCV104 checked closed.		Crew isolates flow from ruptured SG.
No action required to close TDAFW pump drains.	RHR valve isolation valve 2SVS*28 previously closed. Steam supply valve from B SG to turbine-driven AFW pump 2MSS*16 previously closed. Blowdown isolation valve 2BDG*AOV100B1 closed. Main steamline drain 2SDS*AOV111B1 closed. RHR piping drain valve 2SDS*AOV129A closed.		
	B SG narrow range level greater than 5%. Stop feed flow to B SG.		PO checks ruptured SG level.
	Feedwater isolation valve 2FWS*HYV157B closed. MFRV 2FWS*FCV488 closed. Bypass FRV 2FWS*FCV489 closed. AFW throttle valves 2FWE*HCV100C, D closed.		

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	Power to block valves available. PORVs closed (not leaking). PORV block valves open. PRZR safety valves closed (PSMS data). PRT conditions expected.		RO checks PRZR PORVs, block valves, and safeties.
	No SG pressure is dropping in an uncontrolled manner or completely depressurized.		Crew checks if any SGs are faulted.
			PO checks intact SG levels, controls feed flow to maintain 5-50% NR level.
	RCS pressure > 185 psig.		RO checks if LHSI pumps should be stopped,stops pumps and places them in auto.
	B SG pressure approx. 1000 psig.		PO checks ruptured SG pressure > 265 psig.
			Crew initiates RCS cooldown.
	Based on ruptured SG pressure.		ANS determines target temperature for cooldown.
Note: crew may opt to regain condenser steam dump control if not previously performed, or may use ASDVs.	Steam dump is available, greater than 100°F per hour cooldown.		PO selects steam dump to steam pressure mode and dumps steam at maximum rate.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			RO blocks low steamline pressure SI when PRZR pressure is less than 1950 psig.
			STA monitors thermocouples.
	Condenser steam dump controller in auto with pot setting corresponding to current intact SG pressure.		PO stops cooldown when core exit TCs < target temperature.
	Pressure stable.		PO checks ruptured SG pressure.
	Subcooling > 61°F.		Crew checks on RCS subcooling.
	Spray valves available. Both spray valves open		RO depressurizes RCS to minimize break flow and refill PRZR.
	RCS pressure < ruptured SG pressure, and PRZR level > 4% or PRZR level > 76% or subcooling less than Attachment A-5.1.		RO closes spray valves.
Terminate scenario upon completion of the RCS depressurization step of E-3.			

Simulation Facility: Scenario No.: 97-4

Beaver Valley Power Station - Unit 2

Examiners: Applicants:

Initial Conditions:

Rx startup in progress. Rx is at 1E -8 amps, equilibrium conditions. Rod control is in manual.

Turnover:

1. All systems in Normal System Alignment.
2. There are no LCO's in effect.

Event No.	Malf. No.	Event Type*	Event Description
1		R	Raise power to 2% to 5% power.
2		N	Raise power to 2% to 5% power.
3	MALF DSG1A	C	Loss of 2-1 EDG control power due to failed control power supply breaker.
4	CLF XMT MSS25	I	2MSS*PT101A fails high causing 2SVS*PCV101A S/G atmospheric relief valve to fully open. When taken to manual, the valve can be closed.
5	MALF SWD1	M	Loss of offsite power resulting in only one emergency 4KV bus energized/Rx trip.
6	MAL MSS1C	M	On the Rx trip, 21C S/G becomes faulted inside containment.
7	CLF BST PCS (various)	C	Failure of auto CIB actuation on both Trains of SSPS requiring manual actuation of CIB. E-0... E-2... (FR-Z.1) ... E-2... E-1... ES-1.1.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Examiner: _____

Chief Examiner: _____

U2LOTDRL97-4(ic)REV0

INITIAL CONDITIONS: Drill File 834, IC-34
Reactor power = 1E-8 IR amps, RCS boron - 1383 ppm, CBD = 103 steps

ADDITIONAL LINEUP CHANGES	STICKERS	VOND MARKINGS
Set CBD step counters = 103 steps BOL ΔI curve in RO operator aids	None	None

EQUIPMENT STATUS	DATE/TIME OOS	T/S
N/A	N/A	N/A

SHIFT TURNOVER INFORMATION

1. Plant is at 1E-8 a, reactor startup in progress per 2OM-50.4.D. BOL conditions, RCS boron = 1383 ppm, CBD = 103 steps.
2. Startup in progress from Xe free conditions; ECP rod postion of 100 steps CBD, RCS boron = 1383 ppm. Startup procedure 2OM-50.4.D is complete through step B.25, stabilize power at 1E-8 AMPS and record critical data.

SCENARIO SUPPORT MATERIAL REQUIRED

1/2OM-48.1.C(ISS3) Figure 48.1.C-2 (ANSS Turnover Checklist)
2OM-54.2.S1 Log S1-2 (NSS Operating Report)
2OM-54.2.S1 Log S1-5 (NCO Report)
2OM-54.2.S1 Log S1-17 (Shift Operating Report-ANSS)
2OM-50.4.D (Reactor Startup from Mode 3 to Mode 2)
2OM-50.4.F (Estimated Critical Position Calculation)

U2LOTDRL97-4(1)REV0

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Select Drill 834, initialize IC set 34, and establish initial plant conditions.	Reactor plant at power, BOL equilibrium conditions. RCS boron = 1383 ppm, CBD = 103 steps.		
Assign shift positions: ANSS _____ RO _____ PO _____ STA _____	Simulator Frozen until after shift turnover unless it needs to be run momentarily for an alignment change.		
Conduct a shift turnover with the oncoming operators.			Oncoming ANSS should complete the required checklist and carry out a formal shift turnover.
When the shift turnover is complete, place the simulator to RUN and commence the drill.	Simulator running.		Crew assumes control.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #1/2 Continue reactor startup through POAH per 2OM-50.4.D part C (Continue reactor startup to 2-5% power).			Crew continues implementation of 2OM-50.4.D part C. RO withdraws control rods to raise power to 2-5%. RO monitors protection ΔT and power range detectors for agreement as power increase is performed.
When crew addresses 2OM-50.4.D step C.2 (realign auxiliary steam supply), proceed with Event #3.			
EVENT #3 Loss of EDG control power. Insert: MAL DSG1A ACT,0,0,D ANN MSC391R 1,0,D	2-1 EDG start failure. Local panel trouble alarm A8-4E (DG 2-1 control circuit, V2851D). Safety system train A trouble alarm A2-3H.		PO acknowledges alarm, informs ANSS. Crew addresses ARP(s).

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			Crew dispatches operator to 2-1 EDG room to locally investigate status.
After an appropriate delay, inform the control room that local alarm #18 is actuated, and Electrical Maintenance support is requested.			
			Crew evaluates T.S.3.8.1.1, determines that entry into Mode 1 is prohibited with an inoperable EDG. Also, action statement b. requirements are addressed.
After T.S.3.8.1.1 requirements are addressed and crew shows intent to comply, continue with Event #4.			
EVENT #4 Steam pressure transmitter failure, ASDV opens.			
Insert: XMT MSS25 1,1500,20,0,D	Steam pressure transmitter 2MSS*PT101A fails high. ASDV 2SVS*PCV101A opens in automatic control.		
Note: Alarms related to RCS cooldown are dependent on duration of ASDV remaining open.	Steam pressure high alarm A6-7A. Tavg-Tref deviation alarm A4-3C.		Crew recognizes alarm(s), check validity, diagnose transmitter failure.
			Crew determines that 2SVS*PCV101A is inappropriately open; RO manually closes ASDV.
	RCS cooldown stops after ASDV closure.		

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
Crew may decide to conservatively trip the reactor, depending on the magnitude of RCS cooldown. If a trip is performed, monitor implementation of E-0 (reactor trip orSI) and ES-0.1 (reactor trip response).			Crew stabilizes plant at 2 to 5% power. ANSS reports transmitter 2MSS*PT101A failure to I&C.
After the plant is stabilized and I&C is notified, or (if reactor trip was performed) when crew addresses ES-0.1 step 4 (monitor RCS temperature), proceed with Event# 5.			
EVENT #5 Loss of offsite power / one emergency bus.			
Insert: MAL MSS1C ACT,5E5,60,0,0,C, .NOT.JBK42A BST PCS48 2,0,D BST PCS49 2,0,D BST PCS52 2,0,D MAL SWD1 ACT,0,0,D	5E5 lbm/hr C SG steam break inside CNMT one minute after loss of power. 3 of 4 high CNMT pressure CIB actuation bistables disabled. Loss of offsite power.		If reactor was not previously tripped, crew should conservatively trip the reactor. Operators perform immediate actions, ANSS refers to E-0 to verify immediate actions. If reactor was tripped, crew continues in ES-0.1 until SI occurs.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
EVENT #6 Faulted SG inside CNMT.			
	Turbine trip due to reactor trip alarm A5-6D lit. Rod bottom lights lit. Neutron flux dropping.		RO verifies reactor trip.
			RO/PO sounds standby alarm, announces Unit 2 reactor trip.
			EPP evaluation tc be performed later.
	Throttle or governor valves closed. Reheat stop or interceptor valves closed.		PO verifies turbine trip.
	MSR steam supply block valves closed. Reheat controller reset pushbutton depressed.		PO ensures reheat steam isolation.
	Main generator output breakers open. Exciter circuit breaker open.		PO verifies generator trip.
	2DF bus energized.		PO verifies power to AC emergency busses.
	CNMT high pressure SI annunciator, SI signal A12-1D lit. SI is actuated.		RO checks if SI is actuated.
	2-2 EDG running, 2-1 EDG OOS due to previous control circuit problem.		PO verifies EDGs running.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	2FWE*P23B running. 2MSS*SOV105A-F open. 2FWE*HCV100A-F open.		PO verifies AFW status.
	Service water pump 2SWS*P21B running. Service water header pressure 60 - 124 psig.		RO verifies service water system in service.
	HHSI pump 2CHS*P21B running. HHSI flow indicated. LHSI pumps running. SI valve alignment - all indicating lights with red SIS marks lit.		RO/PO verifies SI status.
	CIA actuated, all indicating lights with orange CIA marks LIT.		RO/PO verify CIA.
	All indicating lights with green FWI marks lit.		RO/PO verify FWI.
	CNMT pressure > 3 psig. All indicating lights with yellow SLI marks lit.		RO/PO check if main steamline isolation is required.
EVENT #7 Failure of automatic CIB.	CIB alarm A1-2H not lit. Containment pressure > 8 psig. CIB manually actuated, A1-2H lit. All indicating lights with blue CIB marks lit.		RO checks CIB/spray status, manually actuates both trains of CIB when CNMT pressure is determined to be > 8 psig.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	2CCS-AOV118 opened. One station air compressor running.		PO establishes filtered water cooling to the station air compressors.
	CCP pump 2CCP*P21B running.		RO/PO verify CCP in service.
	SR channels aligned properly.		RO verifies SR high voltage switches in normal.
	AFW greater than 365 gpm.		PO verifies AFW flow greater than 365 gpm.
	Tavg dropping due to C SG steam leak into CNMT.		RO verifies RCS Tavg stable at or trending to 547°F.
			ANSS directs personnel to perform emergency safety function checklists.
	Recirc spray pumps secured (will start after 10.5 min. delay after CIB actuation).		RO checks recirc spray pump status.
	PORVs closed (not leaking). Spray valves closed. Safeties closed (PSMS data). PRT conditions normal.		RO checks PRZR isolated.
	RCPs stopped due to loss of offsite power.		RO checks if RCPs should be stopped.
	C SG pressure dropping.		PO checks if any SGs are faulted.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
			ANSS makes transition to E-2, and informs crew.
Note: transition to FR-Z.1 is possible if CNMT pressure is > 8 psig when CSF status trees are monitored.	CIB has occurred, CREBAPS is actuated.		PO checks control room habitability.
	All yellow SLI marks lit.		PO verifies steam line isolation.
Note: A and B SG pressures may be dropping due to effects of C SG fault, but should not be diagnosed as faulted.	A and B SG pressure stable.		PO checks for any non-faulted SG.
	C SG pressure dropping uncontrollably.		PO identifies faulted SG.
			Crew isolates C SG.
	CNMT isolation valve 2FWS*HYV157C closed. MFRV 2FWS*FCV498 closed. BFRV 2FWS*FCV499 closed. AFW throttle valves 2FWE*HCV100A & B closed.		
When directed to locally hand pump 2FWE*HCV100A, C, and E, use CLF VLV AFW13, 15, 17 via softkey.			
	MDAFW pump 2FWE*P23B running. TDAFW pump tripped from the control room.		

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
When directed to close 2MSS*17, insert: LOA AFW28 0,0,0,D	2MSS*17 closed.		
When directed to open TDAFW pump trip throttle valve, insert: LOA AFW22 0,0,D	2FWE*P22 TTV opened.		
When directed to close 2SVS*29, insert: LOA MSS11 0,0,0,D	2SVS*29 closed.		
Then report actions completed.	Atmospheric dump valve 2SVS*PCV101C isolated. RHR valve 2SVS*HCV104 closed. SG blowdown valve 2BDG*AOV100C1 closed. Blowdown sample valves 2SSR*AOV117A,B,C closed. Steamline drain valves 2SDS*AOV111C1 closed. RHR piping drain valve 2SDS*AOV129A closed.		
	No SG levels rising uncontrollably.		Crew checks if SG tubes are intact. ANSS makes transition to E-1, informs crew.
	CREBAPS is actuated.		PO rechecks control room habitability.

INSTRUCTIONAL GUIDELINES	PLANT STATUS OR RESPONSE	OBJECTIVE	EXPECTED STUDENT RESPONSE
	No RCPs running.		RO checks if RCPs should be stopped.
	B Train RSS pumps running normally (if time delay has elapsed).		RO rechecks recirc spray pump status.
	CNMT sample amber lights lit.		RO verifies both H_2 analyzers running.
	C SG previously diagnosed as faulted and isolated (pending reports of local operator actions).		PO checks if any SG is faulted.
	A and B SGs intact.		PO maintains intact SG levels 5% to 50%.
	PORVs shut in auto and block valves energized.		RO checks PORVs and block valves.
	Subcooling > 41°F. Secondary heat sink satisfactory. RCS pressure stable or rising. PRZR level > 4%.		RO/PO check if SI can be terminated.
			ANSS makes transition to ES-1.1, informs crew.

Terminate the scenario upon ES-1.1 entry.

Beaver Valley Unit 2 NRC Initial License Written Examination Reference Package Index

- Technical Specifications:
  - 3.0.3, Applicability
  - 3.0.5, Applicability
  - 3.1.3.1, Movable Control Assemblies
  - 3.1.3.2, Rod Position Indication Systems - Operating
  - 3.2.5, DNB Parameters
  - 3.7.4.1, Service Water System
  - 3.7.13.1, Standby Service Water System

- VOND Figures:
  - 7-1A Rev. 6, Chemical and Volume Control System
  - 15-2 Rev. 2, Component Cooling Reactor
  - 25-1 Rev. 9, Steam Generator Blowdown

- Annunciator Response Procedures:
  - [A2-4E] 2OM-6.4.AAB "RCP MTR BRG TEMP-TR448B HIGH"
  - [A2-4F] 2OM-6.4.AAC "REACTOR COOLANT PUMP OIL TROUBLE"
  - [A2-5F] 2OM6.4.AAG "REACTOR COOLANT PUMP COOLING WATER TROUBLE"

WRITTEN EXAMINATION COVER SHEET

PROGRAM: Initial Licensed Operator Training

CLASS NUMBER: 2-LOT-1

SUBJECT: Senior Reactor Operator, April 1997 - NRC Initial Licensed Operator Exam.

By this signature, I state that all of the work done on this examination is my own. I have neither given nor received aid.

SIGNATURE _____ **DATE** _____

NAME ANSWER KEY **DLC EMP #** _____
(Please Print)

COMPANY _____
(if other than DLC)

POSSIBLE POINTS 100 **SCORE** _____
Instructor Initials

PREPARED BY David C. Gibson

SIGNATURE DC Gibson 3/27/97

TRAINING DIRECTOR/ SUPERVISOR APPROVAL

_____
Date

Question 2-97-1

What is necessary to defeat interlocks on "Equipment Important to Nuclear Safety" with no permanently installed defeat mechanism?

A. An OSC reviewed and approved procedure.

B. Written approval from the NSS and the NRC Resident Inspector.

C. Written approval from the plant manager/designee.

D. These interlocks are NEVER to be defeated.

ANSWER: A.

REFERENCES: 1/248.3.B pg. B.1

1/2LP-SQS-48.1

K/A #: 194001. A1.02

Source: LOT - 0123

Issue 3 Rev. 8

OBJECTIVE: 12

K/A IMPORTANCE: 4.1/3.9

Question 2-97-2

Which of the following is the LOWEST Emergency Action Level classification that requires the Operations Support Center to be activated?

A. Unusual Event

B. Alert

C. Site Area Emergency

D. General Emergency

ANSWER: B.

Source: LOT - 0126

REFERENCES: EPP/I-3 pg. 7

Issue Rev. 11

LP-EPP-57.81

OBJECTIVE: 1

K/A #: 194001.A1.16

K/A IMPORTANCE: 3.1/4.4

Question 2-97-3

Which of the following identifies the correct sequence for racking out a 4160V breaker?

1. Open the 125 VDC control power breaker
2. Check that breaker is open
3. Turn wrench until breaker is in the disconnect position
4. Engage racking wrench, release lock, and turn CCW
5. Discharge the operating springs

A. 5, 2, 4, 1, 3.

B. 2, 5, 1, 4, 3.

C. 5, 1, 2, 4, 3.

D. 2, 1, 4, 3, 5.

ANSWER: D.

Source: LOT - 0180

REFERENCES: 1/2OM-36.4A pg. A1&A2

Issue 3 Rev. 4

2LP-SQS-36.1

OBJECTIVE: 9rr

K/A #: 194001.K1.07

K/A IMPORTANCE: 3.6/3.7

Question 2-97-4

An operator is assigned to perform a non-emergency evolution in a High Radiation Area measuring 4 REM/hour. His accumulated dose for the current calendar year is 1000 mrem whole body. What is the maximum time that he can remain in the area without exceeding 10CFR Part 20 requirements?

A. 30 minutes

B. 60 minutes

C. 90 minutes

D. 120 minutes

ANSWER: B. Source: LOT - 0313

REFERENCES: 10 CFR Part 20.1201 item 1.i page 291(Jan 96) Issue Rev.

2LP-SQS-GERT OBJECTIVE: 3-5

K/A #: 194001.K1.03 K/A IMPORTANCE: 2.8/3.4

Question 2-97-5

Per Technical Specifications, which of the following describes the process of making a qualitative assessment of an instrument channel's behavior during operation, by visually comparing the indication to independent instrument channels measuring the same parameter.

A. Channel verification

B. Channel functional test

C. Channel check

D. Channel calibration

ANSWER: C.

Source: LOT - 0316

REFERENCES: TS Definitions

Issue Rev.

2LP-SQS-TS

OBJECTIVE: 7

K/A #: 194001.A1.13

K/A IMPORTANCE: 4.3/4.1

Question 2-97-6

Which of the following statements describes the MINIMUM required Control Room staffing when the Unit is in Mode 6?

A. One qualified SRO and one qualified RO must be in the Controls Area.

B. One qualified SRO must be in the Controls Area.

C. One qualified RO must be in the Control Room Area.

D. One qualified SRO must be in the Controls Room Area.

ANSWER: C. Source: LOT - 0323

REFERENCES: 1/2OM-48.1 Page 5 A.1 and T.S. 6.2 Issue 3 Rev. 4

1/2LP-SQS-48.1 OBJECTIVE: 2

K/A #: 194001.A1.02 K/A IMPORTANCE: 4.1/3.9

Question 2-97-7

If an operator observes a valid plant condition that indicates the need for a Reactor Protection System or Safety System actuation, the operator should immediately...

A. commence a Controlled Plant Shutdown.

B. commence an Emergency Plant Shutdown.

C. manually initiate the Protective Action.

D. dispatch an operator to the Reactor Trip Breakers.

ANSWER: C. Source: LOT - 0328

REFERENCES: 1/2OM-48.1B Pg. 8 item 4 Issue 3 Rev. 17

1/2LP-SQS-48.1 OBJECTIVE: 3

K/A #: 194001.A1.13 K/A IMPORTANCE: 4.3/4.1

Question 2-97-8

Under which of the following situations could an independent verification of a valve on a valve list be waived?

A. Independent verification would result in a personnel exposure greater than 2 mR.

B. The valve is verified during the performance of a Temporary Operating Procedure (TOP).

C. The valve is located such that scaffolding must be erected to perform the independent verification.

D. The valve can be verified by a functional test using qualified instrumentation.

ANSWER: D.

Source: New

REFERENCES: 1/2OM48.3.D.VI.A.6.f

Issue 3 Rev. 17

1/2LP-SQS-48.1

OBJECTIVE: 30

K/A #: 194001.K1.01

K/A IMPORTANCE: 3.6/3.7

Question 2-97-9

An MOV that is required to be CLOSED on an SI signal and is subject to large thermal stresses, is manually placed on its backseat to allow for maintenance.

Assuming the backseating was the only action/work performed on the valve, prior to returning the valve to OPERABLE status, the valve must be…

A. electrically stroked CLOSED and OPEN, ONE time.

B. electrically stroked CLOSED and OPEN, TWO times.

C. manually stroked CLOSED and then electrically stroked OPEN.

D. manually stroked CLOSED and OPEN and then electrically stroked CLOSED and OPEN.

ANSWER: A. Source: LOT - 0388

REFERENCES: 1/2OM48.3.D.VI.A.10.e pg. D6 Issue 3 Rev. 16

1/2LP-SQS-48.1 OBJECTIVE: 23

K/A #: 194001.K1.01 K/A IMPORTANCE: 3.6/3.7

Question 2-97-10

Which of the following areas, by definition, could one expect to receive a dose in any one hour period in excess of 0.5 mrem?

1. Vital Area
2. High Radiation Area
3. Locked High Radiation Area
4. Radiation Area

A. 1,2,3

B. 1,2,4

C. 1,3,4

D. 2,3,4

ANSWER: D.

Source: LOT - 0482

REFERENCES: 10CFR 20.1003

Issue Rev.

2LP-SQS-GERT

OBJECTIVE: 4-8

K/A #: 194001.K1.03

K/A IMPORTANCE: 2.8/3.4

Question 2-97-11

The LOWEST Emergency Classification that REQUIRES the implementation of Site Accountability is a(n) ___(1)___. This Accountability must be completed within ___(2)___.

A. Alert; 30 minutes.

B. Site Area Emergency; 30 minutes.

C. Alert; 60 minutes.

D. Site Area Emergency; 60 minutes.

ANSWER: B.

REFERENCES: EPP/I-4 pg. 2 NOTE

LP-EPP-57.81

K/A #: 194001.A1.16

Source: LOT - 0723

Issue Rev. 11

OBJECTIVE: 19

K/A IMPORTANCE: 3.1/4.4

Question 2-97-12

Which of the following statements is applicable to independent verifications?

1. The independent verification shall be performed using the "hands on" method.
2. Accurate remote or reliable local indication may be used.
3. Independent verification for valves on a clearance switching order cannot be substituted by a valve list or procedure.
4. The original verification and independent verification of a component may be performed simultaneously.

A. 1,2 and 3.

B. 1,2 and 4.

C. 1,3 and 4.

D. 2,3 and 4.

ANSWER: A.

Source: LOT - 0804

REFERENCES: 1/2OM48.3.D.VI.A.6.c

Issue 3 Rev. 17

1/2LP-SQS-48.1

OBJECTIVE: 30

K/A #: 194001.K1.01

K/A IMPORTANCE: 3.6/3.7

Question 2-97-13

Which of the following describes when an operator can take reasonable action that departs from a license condition or a Technical Specification?

A. Under NO circumstances shall Technical Specifications be intentionally violated.

B. In an emergency situation when this action is immediately needed to prevent damage to a piece of machinery.

C. In an emergency situation when this action is immediately needed to protect the public health and safety.

D. In an emergency situation when this action is immediately needed to prevent an automatic Safety Injection from occurring.

ANSWER: C. Source: LOT - 0807

REFERENCES: 1/2OM-48.1.3.F pg. 3 Issue 3 Rev. 9

1/2LP-SQS-48.1 OBJECTIVE: 10

K/A #: 194001.A1.02 K/A IMPORTANCE: 4.1/3.9

Question 2-97-14

The VOND marking "VDM" next to a motor-operated valve (MOV) indicates that the MOV…

A. may drift open if the handwheel is engaged.

B. may drift open if the handwheel is disengaged.

C. can NOT be used as a clearance point.

D. can ONLY be used as a clearance point in a low pressure (<100 psig) system.

ANSWER: A.

Source: LOT - 0830

REFERENCES: NGAM 3.4 pg. 12

Issue Rev. 6

1/2LP-SQS-48.1

OBJECTIVE: 25

K/A #: 194001.K1.02

K/A IMPORTANCE: 3.7/4.1

Which of the following describes the Operations Standard with regard to reactivity control during Mode 1 operation?

A. All reactivity manipulations are to be announced to the control room crew and acknowledged by an SRO.

B. The RO has the responsibility to control the reactor within allowable specifications, therefore SRO approval need not be received for normal reactivity manipulations.

C. SRO approval for reactivity manipulations is only required for turbine load adjustment, normal rod and boron concentration adjustments may be made without SRO approval.

D. SRO approval for reactivity manipulations is only required for boron concentration and turbine load adjustments, normal rod movement may be made without SRO approval.

ANSWER: A. Source: LOT - 0894

REFERENCES: Operations Standards A.14 Issue Rev. 14

1/2LP-SQS-48.1 OBJECTIVE: 39

K/A #: 194001.A1.03 K/A IMPORTANCE: 2.5/3.4

Question 2-97-16

Use of a CAUTION tag is PROHIBITED for which of the following conditions?

A. Special additional manual actions are required to manipulate the tagged component.

B. Operation of the tagged component will be affected because a portion of the system is NOT in NSA.

C. As a temporary replacement for a component label that has fallen off.

D. As a warning that operation of the component will cause erratic indication.

ANSWER: C.

Source: 1-97 Audit

REFERENCES: 1/2OM-48.3.L

Issue Rev.

1/2LP-SQS-48.1

OBJECTIVE: 15

K/A #: 194001.K1.02

K/A IMPORTANCE: 3.7/4.1

Question 2-97-17

During a maintenance outage, the boundaries on a clearance permit need to be moved to support a partial system restoration. The electrical department Work Party Leader signed on the clearance is offsite and CANNOT be reached. At a minimum, whose authorization is necessary to move the boundaries of this clearance?

A. The electrician that assisted the Work Party Leader in performing the work under the clearance.

B. The Work Party Leaders direct supervisor.

C. The Outage Manager.

D. The Site Safety Engineer.

ANSWER: B.

REFERENCES: NPDAP 3.4.IV.A.1.i

1/2LP-SQS-48.1

K/A #: 194001.K1.02

Source: New

Rev. 6

OBJECTIVE: 33

K/A IMPORTANCE: 3.7/4.1

Question 2-97-18

Which of the following statements describes the control actions that occur when ANY rod control system Rod Stop (C-1 thru C-5) is active?

With the Rod Control Selector Switch in...

A. AUTOMATIC, outward rod motion is always prevented, but inward rod motion is allowed.

B. AUTOMATIC, BOTH outward and inward rod motion is prevented.

C. MANUAL, outward rod motion is always prevented, but inward rod motion is allowed.

D. MANUAL, BOTH outward and inward rod motion is prevented.

ANSWER: A.

Source: Braidwood - 56

REFERENCES: 2OM-1.2.B, Page 8

Issue 4 Rev. 3

2LP-SQS-1.3

OBJECTIVE: 10

K/A #: 3.01.001.050.K4.01

K/A IMPORTANCE: 3.4/3.8

Question 2-97-19

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations.
- Annunciator [A4-3C] TAVG DEV FROM TREF is received.
- Computer point indicates TAVG is LOW.

You are directed to adjust RCS temperature using the Boration/Dilution controls. Determine the mode of makeup control required and the expected corresponding valve lineup.

A. Borate;
[2CHS*FCV113A] Boric acid flow control valve - OPEN
[2CHS*FCV114A] Primary water flow control valve - CLOSED
[2CHS*FCV113B] Makeup stop valve to the charging pump suction - CLOSED
[2CHS*FCV114B] Makeup stop valve to the VCT - OPEN

B. Borate;
[2CHS*FCV113A] Boric acid flow control valve - OPEN
[2CHS*FCV114A] Primary water flow control valve - CLOSED
[2CHS*FCV113B] Makeup stop valve to the charging pump suction - OPEN
[2CHS*FCV114B] Makeup stop valve to the VCT - CLOSED

C. Dilute;
[2CHS*FCV113A] Boric acid flow control valve - CLOSED
[2CHS*FCV114A] Primary water flow control valve - OPEN
[2CHS*FCV113B] Makeup stop valve to the charging pump suction - OPEN.
[2CHS*FCV114B] Makeup stop valve to the VCT - CLOSED

D. Dilute;
[2CHS*FCV113A] Boric acid flow control valve - CLOSED
[2CHS*FCV114A] Primary water flow control valve - OPEN
[2CHS*FCV113B] Makeup stop valve to the charging pump suction - CLOSED
[2CHS*FCV114B] Makeup stop valve to the VCT - OPEN

ANSWER: D.

Source: Modified 1-97-004

REFERENCES: 2OM-7.1.D

Issue 4 Rev. 3

2LP-SQS-7.1

OBJECTIVE: 7

K/A #: 3.01.004.010.A4.03

K/A IMPORTANCE: 3.9/3.7

The Unit is operating at 100% power with all systems in their at power, NSA configurations with the exception of RCS Letdown. The Excess Letdown HX is in service with flow to the VCT, with Normal Letdown secured. A Reactor trip and Safety Injection are manually actuated. PRIOR to resetting the Safety Injection Signal, Excess Letdown Flow will be…

A. STOPPED, due to the CIA signal CLOSING the Excess Letdown flow control valve [2CHS*HCV137].

B. STOPPED, due to the CIA signal CLOSING the containment seal return isolation valves [2CHS*MOV378 and 381].

C. DIVERTED to the Primary Drains Transfer Tank [2TK-21] due to the CIA signal positioning the Excess Letdown flow directing valve [2CHS*HCV389] to the [2TK-21] position.

D. DIVERTED to the PRT via the seal water return line relief valve [2CHS*RV382A] due to the closure of the containment isolation valves [2CHS*MOV378 and 381].

ANSWER: D. Source: Byron - 22

REFERENCES: 2OM-7.1.C Issue 4 Rev. 3

2LP-SQS-7.1 OBJECTIVE: 4

K/A #: 3.01.00' 0.A1.08 K/A IMPORTANCE: 3.0/3.0

The Unit is operating at 88% power with all systems in their at-power, NSA configurations. The following indications are observed:

- Reactor power is RISING.
- T_{ave} is greater than T_{ref}.
- PZR PORV [2RCS*PCV455C] is OPEN.
- PZR level is RISING.

Which of the following would cause the above listed conditions to occur?

A. An OT/ΔT Turbine Runback.

B. An Uncontrolled Rod Withdrawal.

C. A Failed OPEN S/G Safety Valve.

D. Power Range channel N-44 failed HIGH.

ANSWER: B. Source: Braidwood - 89

REFERENCES: 2OM-53C B Issue 1A Rev. 2

2LP-SQS-53C.1 OBJECTIVE: 2

K/A #: 3.01.000.0(K1.0(K/A IMPORTANCE: 4.0/4.2

Question 2-97-22

Which of the following is the correct sequence of steps that the operator needs to perform to recover a Dropped Control Rod in Control Bank D (CBD), IAW AOP 2OM-53C.4.2.1.5, Dropped RCCA?

1. Withdraw the Dropped Rod to the height of the remainder of the CBD rods.
2. Place the Rod Group Selector Switch in MANUAL.
3. Place the Rod Group Selector Switch in the CBD position.
4. Reset the ROD CONTROL SYSTEM URGENT ALARM.
5. Adjust Tave to equal Tref using Boration/Dilution controls.
6. Align the CBD Lift Coil Disconnect Switches, and Reset the CBD Group Step Counter and the P/A Converter to Zero.

A. 3, 5, 6, 1, 4.

B. 5, 2, 6, 4, 1.

C. 5, 3, 6, 1, 4.

D. 5, 3, 6, 4, 1.

ANSWER: C.

Source: New

REFERENCES: 2OM-53C.4.2.1.5

Issue 1A Rev. 4

2LP-SQS-53C.1

OBJECTIVE: 5

K/A #: 3.01.000.003.EA1.02

K/A IMPORTANCE: 3.6/3.4

Question 2-97-23

The Unit is operating at 40% power with all systems in their at power, NSA configurations. An event occurs that causes the following indications:

- Annunciator [A4-8G] ROD POSITION DEVIATION is lit.
- Annunciator [A4-9F] ROD AT BOTTOM is lit.
- RCS T_{ave} dropped from 559°F to 549°F.
- PZR Pressure dropped from 2235 psig to 2180 psig.
- Control Bank D Group Step Counters are at 220 steps.

Based on these conditions, which of the following statements describes the Technical Specification required actions?

A. Restore T_{ave} to >551°F within 15 minutes or be in HOT STANDBY within the next 15 minutes.

B. Within 4 hours; Restore the dropped rod to OPERABLE status within $\pm$ 12 steps of its group step demand counter, or adjust the remainder of the CBD rods to within $\pm$ 12 steps of the dropped rod.

C. Determine the position of the rod with the failed Digital Rod Position Indicator by the movable incore detectors at least once per 8 hours.

D. Restore PZR Press to >2206 psig within 2 hours or be < 5% of RATED THERMAL POWER within the next 4 hours.

Provide the following references: TS 3.1.3.1 Movable Control Assemblies, 3.1.3.2 Position Indication Systems - Operating, 3.2.5 DNB Parameters.

ANSWER: D.

Source: Braidwood - 116

REFERENCES: U2 TS 3.2.5

Amendment No. 51

2LP-SQS-TS

OBJECTIVE: 1

K/A #: 3.01.000.003.G03

K/A IMPORTANCE: 3.3/3.8

Question 2-97-24

The Unit is operating at 65% power with all systems in their at-power, NSA configurations. Power is being raised with Rod Control in AUTO, and Control Bank D Group Step Counter at 215 steps when ONLY the following Annunciators are received:

- [A4-8G] ROD POSITION DEVIATION
- [A4-5H] NIS POWER RANGE HIGH/LOW SP FLUX DEVIATION/AUTO DEFEAT
- [A4-4F] NIS POWER RANGE COMPARATOR DEVIATION

Which of the following events would cause the plant conditions listed above?

A. Rod Control Urgent Failure on the Control Bank D Group 1 Power Cabinet.

B. One control rod is misaligned from its group step counter by greater than 12 steps.

C. A single Digital Rod Position Indicator in Control Bank D has failed at 202 steps.

D. A single Dropped Control Rod in close proximity to a Power Range Neutron Detector.

ANSWER: B. Source: Zion - 120

REFERENCES: 2OM-2.4.AAD/AAK Issue 1/1 Rev. 2/2

2LP-SQS-1.3 OBJECTIVE: 15.i

K/A #: 3.01.000.005.EA2.01 K/A IMPORTANCE: 3.3/4.1

Question 2-97-25

Given the following:

- An Automatic Reactor Trip has just occurred.
- The Main Turbine did NOT trip automatically.
- The Main Generator Output Breakers [PCB-352 and 362] are still CLOSED.

Which of the following describes the procedural action and bases required for this situation?

A. Open the Main Generator Output Breakers [PCB-352 and 362] to prevent motoring the Main Generator.

B. Open the Main Generator Output Breakers [PCB-352 and 362] to actuate an additional Main Turbine Trip.

C. Manually Trip the Main Turbine to prevent a Loss of Heat Sink.

D. Manually Trip the Main Turbine to prevent an uncontrolled RCS cooldown.

ANSWER: D.

Source: Braidwood - 97

REFERENCES: 2OM-53B.4.E-0

Issue 1B Rev. 3

2LP-SQS-53A.1

OBJECTIVE: 3

K/A #: 3.01.000.007.EK1.03

K/A IMPORTANCE: 3.7/4.0

Given the following:

- The Unit is operating at 75% power with all systems in their at-power, NSA configurations when 2FWS-P21B, the B MFP tripped.
- The operators are responding to the transient IAW Annunciator A6-10A STM GEN FEEDPUMP 21A/B AUTO-STOP, ARP 2OM-24.4.AAE and the EMERGENCY SHUTDOWN procedure, 2OM-53C.4.2.51.1.
- The Main Turbine is being run back at 5%/minute.
- Rod Control is in AUTOMATIC.

The following indications are observed:

- All S/G Levels are approximately 35% and RISING.
- Annunciator [A6-6A] MOIST SEP DRAINS RCVR TANK/PUMP TROUBLE is LIT.
- Annunciator [A4-8D] ROD CONTROL BANK D LOW is LIT.
- Annunciator [A4-9D] ROD CONTROL BANK D LOW LOW is LIT.

Based on the above indications, which of the following should be done first?

A. Stop the EMERGENCY SHUTDOWN procedure, and commence a Normal Boration per 2OM-7.4.K, Blender Boration Operation.

B. Continue with the EMERGENCY SHUTDOWN procedure, and concurrently enter 2OM-23B.4.C, HEATER DRAIN SYSTEM SHUTDOWN to remove the Heater Drain Pumps from service.

C. Continue with the EMERGENCY SHUTDOWN procedure, and concurrently commence a Normal Boration per 2OM-7.4.K, Blender Boration Operation.

D. Continue with the EMERGENCY SHUTDOWN procedure, and concurrently commence an Emergency Boration per 2OM-7.4.Q, Emergency Boration.

ANSWER: D.

Source: Braidwood - 78

REFERENCES: 2OM-1.4.AAM

Issue 4 Rev. 0

2LP-SQS-1.3

OBJECTIVE: 17.f

K/A #: 3.01.000.024.EK3.01

K/A IMPORTANCE: 4.1/4.4

Question 2-97-27

The Unit is operating at 100% power with all systems in their at-power, NSA configurations with the following exception:

- Testing is in progress on Train 'B' of the Solid State Protection System (SSPS).
- The 'B' Rx Trip Breaker (RTB) is OPEN.

For the above listed conditions, which of the following will result in a Rx Trip?

1. Racking IN but NOT CLOSING the 'A' Train Rx Trip BYPASS breaker.
2. Racking IN and CLOSING the 'A' Train Rx Trip BYPASS breaker.
3. CLOSING the 'A' Train Rx Trip BYPASS breaker in the Racked OUT position.

A. 1 and 2.

B. 2 and 3.

C. 2 ONLY.

D. 1, 2, and 3.

ANSWER: C.

Source: New

REFERENCES: UFSAR Figure 7.3-7

Rev. 7

2LP-SQS-1.2

OBJECTIVE: 8

K/A #: 3.01.000.029.EK2.06

K/A IMPORTANCE: 2.9/3.1

Question 2-97-28

Step 8 of FR-S.1, "Response to Nuclear Power Generation - ATWS", requires that RCS pressure be verified less than 2335 PSIG and if not, reduce RCS pressure to less than 2135 psig. The reason RCS pressure is reduced at this point in the procedure is to...

A. maximize boration flow from the high head charging pumps.

B. minimize the possibility of a PZR PORV failing open or leaking excessively.

C. prevent opening the PZR Code Safety Valves.

D. prevent exceeding the RCS subcooling limit assumed in the UFSAR accident analysis.

ANSWER: A.

Source: Byron - 67

REFERENCES: 2OM-53B.4.FR-S.1

Issue 1B Rev. 4

2LP-SQS-53A.1

OBJECTIVE: 3

K/A #: 3.01.000.029.EK3.12

K/A IMPORTANCE: 4.4/4.7

Question 2-97-29

Which of the following describes the method used to position the group step counters and digital rod position indicators (DRPI) to zero steps following the initial startup of the Rod Drive MG Sets and the DRPI system?

Depress the ___(1)___ Pushbutton to reset the group step counters to zero steps and ___(2)___ if any DRPI does not indicate zero steps.

A. STARTUP; depressing the STARTUP pushbutton will reset DRPI to zero…

B. STEP COUNTERS RESET; depress the STARTUP pushbutton…

C. STARTUP; Cycle the ACCURACY MODE SELECTOR switch to the A ONLY position back to the A+B position…

D. STEP COUNTERS RESET; request I&C to calibrate DRPI…

ANSWER: D.

Source: New

REFERENCES: 2OM-50.4.D pg. 10

Issue 1, Rev. 25

2LP-SQS-1.2

OBJECTIVE: 2.d.8

K/A #: 3.01.014.000.A4.04

K/A IMPORTANCE: 2.7/2.7

Question 2-97-30

During a reactor startup, the "ROD AT BOTTOM" annunciator will be LIT when...

1. CBA Rod Bottom Lights are OFF and CBB, CBC and CDD Rod Bottom Lights are LIT.
2. CBA, CBB and CBC Rod Bottom Lights are OFF and CBD Rod Bottom Lights are LIT.
3. CBA, CBC and CBD Rod Bottom Lights are OFF and ONLY 1 CBB Rod Bottom Light is LIT.

A. 1 and 2

B. 1 and 3

C. 2 and 3

D. 3 ONLY

ANSWER: D.

REFERENCES: 2OM-1.4.AAA

2LP-SQS-1.4

K/A #: 3.01.014.000.K4.03

Source: Zion - 4

Issue 4 Rev. 1

OBJECTIVE: 8

K/A IMPORTANCE: 3.2/3.4

Question 2-97-31

Which of the following components is credited in the UFSAR accident analysis as being DESIGNED to mitigate the pressure rise in the RCS following a Turbine Trip WITHOUT an accompanying Reactor Trip?

A. PZR Code Safety Valves.

B. PZR Spray Valves.

C. S/G Atmospheric Dump Valves.

D. PZR Level Control System-Surge Volume.

ANSWER: A.

Source: Zion - 63

REFERENCES: UFSAR 15.2-6&7

Rev. 0

2LP-SQS-6.5

OBJECTIVE: 3.c

K/A #: 3.02.002.000.K4.10

K/A IMPORTANCE: 4.2/4.4

Question 2-97-32

Which of the following describes the reason for the ECCS acceptance criterion which specifies 2200°F as the maximum peak cladding temperature?

A. This is 500°F below the clad melt point of 2700°F.

B. This is 1000°F below the clad melt point of 3200°F.

C. Above this temperature, thermal conductivity of the clad drops significantly.

D. Above this temperature, the zircalloy-water reaction is greatly accelerated.

ANSWER: D.

Source: Braidwood - 96

REFERENCES: 1/2LP-NOMCD-1.1

Rev. 9

1/2LP-NOMCD-1.1

OBJECTIVE: 11

K/A #: 3.02.006.000.G10

K/A IMPORTANCE: 3.4/3.7

Given the following:

- The Unit was operating at 100% power.
- A loss of Station Instrument Air has occurred.
- The Unit has been tripped due to low IAS pressure.

AOP 2.34.1, "Loss of Station Instrument Air" directs the operator to CLOSE [2CHS*MOV289] Normal Charging Header Isolation Valve, because…

A. of the loss of normal PRZR level control.

B. [2CHS*LCV115A] Letdown Divert Valve failed to the degasifier.

C. [2CHS*PCV145] Letdown Pressure Control Valve, failed CLOSED.

D. of the continuous boration of the VCT.

ANSWER: A. Source: North Anna - 86

REFERENCES: 2OM-53.C.4.2.34.1 pg. 6 Issue 1A Rev. 2

2LP-SQS-53C.1 OBJECTIVE: 4

K/A #: 3.02.000.022.EK3.07 K/A IMPORTANCE: 3.0/3.2

Question 2-97-34

Given the following:

- The Unit is at 100% power.
- All systems are in their at power, NSA configurations.
- The pressurizer level selector switch is in position 1, 459/460.
- [2RCS*LT459] PZR level transmitter, fails at 54%.

Assuming NO operator action is taken, which of the following describes the system response when plant load is REDUCED?

Charging flow...

A. AND actual PZR level will RISE. The Reactor will trip on high PZR level.

B. will rise AND actual PZR level will be maintained at 54%. The B/U heaters will energize, and the Reactor will NOT trip.

C. AND actual PZR level will DROP. At 14% actual PZR level, letdown will isolate and all PZR heaters will de-energize.

D. remains constant but actual PZR level DROPS. No control or protective actions will occur.

ANSWER: C.

Source: Zion - 112

REFERENCES: UFSAR Figure 7.3-16

Rev. 3

2LP-SQS-6.4

OBJECTIVE: 14

K/A #: 3.02.000.028.EA2.02

K/A IMPORTANCE: 3.4/3.8

Question 2-97-35

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations.
- The PZR level selector switch is in position 1 459/460.
- [2RCS*LT459] PZR level transmitter reference leg develops a slow leak at the transmitter connection.

Which of the following describes the plant response to this reference leg leak?

	PZR Level Indicator 2RCS*LI459	PZR Level Indicator 2RCS*LI460	VCT level Indicator 2CHS*LI112
A.	RAISE	DROP	RAISE
B.	DROP	RAISE	RAISE
C.	RAISE	DROP	DROP
D.	DROP	RAISE	DROP

ANSWER: A.

Source: Byron - 99

REFERENCES: UFSAR Figure 7.3-16

Rev. 3

2LP-SQS-6.4

OBJECTIVE: 14

K/A #: 3.02.000.028.EK1.01

K/A IMPORTANCE: 2.8/3.1

Question 2-97-36

An RCS cooldown is in progress IAW 2OM-53A.4.ES-0.3, "Natural Circulation Cooldown With Steam Void In Vessel (With RVLIS)."

Adjusting charging flow GREATER THAN letdown flow will ___(1)___ the size of the Rx vessel head void, and cause PZR level to ___(2)___.

	(1)	(2)
A.	INCREASE	RISE
B.	REDUCE	RISE
C.	INCREASE	DROP
D.	REDUCE	DROP

ANSWER: D.

REFERENCES: 2OM-53B.4.ES-0.3 pg. 19

2LP-SQS-53A.1

K/A #: 3.02.011.000.K5.15

Source: North Anna - 41

Issue 1B Rev. 3

OBJECTIVE: 6

K/A IMPORTANCE: 3.6/4.0

Question 2-97-37

Given the following:

- An automatic Safety Injection has occurred.
- The operators are about to RESET the Safety Injection signal.

Which of the following describes why manual action may be required to restart safeguards equipment if offsite power is lost after the SI signal is reset?

When the SI signal is RESET…

A. the SI signal to the sequencer is removed which disables the sequencer from loading in the Accident Plus Blackout mode of operation.

B. the start signal to the Safeguards Equipment is removed, even if a valid SI demand signal still exists.

C. the sequencer is disabled until the Rx Trip Breakers are CLOSED to remove the P4 lockout.

D. the only way to restart the safeguards loads following a subsequent loss of offsite power is to manually initiate SI when the sequencer has finished loading the blackout loads.

ANSWER: B.

Source: M-LOT - 0194

REFERENCES: 2OM-53B.4.E-3 pg. 52

Issue 1Bb Rev. 5

2LP-SQS-53A.1

OBJECTIVE: 4

K/A #: 3.02.013.000.A4.02

K/A IMPORTANCE: 4.3/4.4

Question 2-97-38

Which of the following would require the manual initiation of BOTH a manual Rx Trip AND Safety Injection if neither had occurred automatically?

A. All PRZR pressure instruments are indicating 1940 psig.

B. The General Warning Lamps on the front of the SSPS Train 'A' and Train 'B' Logic Cabinets are both lit.

C. All Containment Pressure instruments are indicating 2.2 PSIG.

D. Rx Power is at 45% and all PRZR level instruments indicate 95%.

ANSWER: C.

Source: North Anna - 25

REFERENCES: 2OM-11.2.B pg. 3

Issue 4 Rev. 1

2LP-SQS-1.1

OBJECTIVE: 5

K/A #: 3.02.013.000.G14

K/A IMPORTANCE: 4.2/4.2

Question 2-97-39

Which of the following describes the reason that the tailpipe temperature of a leaking PRZR PORV is NOT the same as the PRZR steam space temperature and what the resultant tailpipe conditions should be?

The throttling process through the PRZR PORV is a constant…

A. enthalpy process which always results in saturation conditions at the PORV outlet, dependent only upon PRT pressure.

B. enthalpy process which could result in saturation or superheated conditions at the PORV outlet, dependent upon the enthalpy of the steam at the PORV inlet and PRT pressure.

C. entropy process which could result in saturation or superheated conditions at the PORV outlet dependent upon the entropy of the steam at the PORV inlet and the PRT pressure.

D. entropy process which always results in saturation conditions at the PORV outlet dependent only upon the PRT pressure.

ANSWER: B.

Source: New

REFERENCES: Mollier Diagram

Issue Rev.

1/2LP-NOMCD-1.1

OBJECTIVE: 8

K/A #: 3.03.000.008.EK3.02

K/A IMPORTANCE: 3.6/4.1

Given the following:

- The Rx was at full power with all systems in their at-power, NSA configurations when a Rx Trip and Safety Injection occurred.
- All systems functioned as designed.
- S/G Pressures are: A=1005 psig, B=1000 psig, C=1000 psig.
- S/G Narrow Range levels are: A=40%, B=42%, C=35%.
- All RCP's are running.
- HHSI Flow is indicated on [2SIS*FI943].
- RCS pressure is 1700 psig and stable.
- RCS subcooling based on CET's is 63°F.
- PZR level is 52% and rising.
- Containment pressure is 4.6 psig.
- The operators have made the following EOP transitions:
  - E-0, Rx Trip or Safety Injection, to
  - E-1, Loss of Reactor or Secondary Coolant.

Based upon these conditions, the operators should...

A. trip ALL RCPs and transition to ES-1.1, SI Termination.

B. maintain all RCPs in service and transition to ES-1.1, SI Termination.

C. maintain all RCPs in service and continue on in E-1 until SI termination criteria are reached.

D. MANUALLY initiate Containment Spray and transition to FR-Z.1, Response to High Containment Pressure.

ANSWER: C.

Source: Byron - 86 (Modified)

REFERENCES: 2OM-53A.1.E-1 pg. 7

Issue 1B Rev. 4

2LP-SQS-53A.1

OBJECTIVE: 6

K/A #: 3.03.000.009.EA2.34

K/A IMPORTANCE: 3.6/4.2

Question 2-97-41

The small break LOCA recovery procedure ES-1.2, "Post-LOCA Cooldown and Depressurization" performs an evaluation to 'Check If An RCP Should Be Started.' This group of steps includes a check that ensures PZR level is greater than 14% prior to starting an RCP.

The bases for this pressurizer level check ensures that when an RCP is started and the Rx vessel head void is collapsed...

A. sufficient RCS inventory exists to prevent PZR level from dropping off scale low.

B. SI re-initiation criteria will NOT be met.

C. RCS pressure does NOT drop below 215 psig thus maintaining RCP seal integrity.

D. adequate PZR steam space is available to limit the RCS pressure rise.

ANSWER: A.

Source: Byron - 86, Modified.

REFERENCES: 2OM-53B.4.ES-1.2 Step 17

Issue 1B Rev. 4

2LP-SQS-53A.1

OBJECTIVE: 3

K/A #: 3.03.000.009.EK3.21

K/A IMPORTANCE: 4.2/4.5

Question 2-97-42

Which of the following series of actions describes the high level action summaries for ECA-1.1, "Loss of Emergency Coolant Recirculation" if this procedure was entered during the injection phase of a LOCA?

A. MINIMIZE Containment Spray and ECCS Flows, Cooldown the RCS at 100°F/Hr, Depressurize the RCS to reduce break flow.

B. MINIMIZE Containment Spray and ECCS Flows, Cooldown the RCS at MAXIMUM rate, Depressurize the RCS to inject the SI accumulators.

C. MINIMIZE Containment Spray and ECCS Flows, Cooldown the RCS at MAXIMUM rate, Depressurize the RCS to reduce break flow.

D. MAXIMIZE Containment Spray and ECCS Flows, Cooldown the RCS at 100°F/Hr, Depressurize the RCS to MINIMIZE RCS subcooling.

ANSWER: A.

Source: Zion - 122, Modified.

REFERENCES: 2OM-53B.4.ECA-1.1.II.B

Issue 1B Rev. 4

2LP-SQS-53A.1

OBJECTIVE: 3

K/A #: 3.03.000.011.EA1.11

K/A IMPORTANCE: 4.2/4.2

Question 2-97-43

The Unit has experienced a large-break LOCA. The operators have just transitioned to ES-1.3, "Transfer to Cold Leg Recirculation" due to the low water level in the RWST. The following conditions are reported by the STA after SI is RESET in ES-1.3:

- A Core Cooling ORANGE path exists due to Core Exit Thermocouples reading 845°F.
- An Integrity RED Path exists due to RCS conditions to the LEFT of Limit A.
- LHSI Pump [2SIS*P21B] has TRIPPED on overcurrent.
- All other systems are functioning as designed.

What course of action should the operators take?

A. Immediately transition to FP-P.1, Response to Imminent Pressurized Thermal Shock, Step 1.

B. Complete the alignment to Cold Leg Recirculation (steps 1-6 of ES-1.3), and then transition to FR-C.2, Response to Degraded Core Cooling, Step 1.

C. Immediately transition to ECA-1.1, Loss of Emergency Coolant Recirculation, Step 1.

D. Complete the alignment to Cold Leg Recirculation (steps 1-6 of ES-1.3), and then transition to FR-P.1, Response to Imminent Pressurized Thermal Shock, Step 1.

ANSWER: D. Source: Braidwood - 93

REFERENCES: 1/2OM-53B.2 pg. 8 Issue 1B Rev. 2

2LP-SQS-53A.1 OBJECTIVE: 6

K/A #: 3.03.000.011.G12 K/A IMPORTANCE: 4.0/4.1

Question 2-97-44

The Unit is operating at 83% power. Pressurizer Pressure Protection Channel [2RCS*PT455] was declared inoperable seven (7) hours ago with the associated bistables tripped per OM-6.4.IF, "Instrument Failure Procedure." The on-coming RO notes a concern during turnover that the P-11 bistable is NOT tripped because the bistable light on BB-B is NOT lit.

The off-going RO should…

A. check the P-11 B/S light bulbs. If it is determined NOT to be a bulb problem, report the B/S tripping error to the NSS/ANSS.

B. check the P-11 B/S light bulbs. If it is determined NOT to be bulb problem, have the other on-duty NCO trip the P-11 B/S.

C. inform the on-coming NCO that the P-11 bistable light is not fed from Pressurizer Pressure Protection Channel [2RCS*PT455].

D. inform the on-coming NCO that the P-11 bistable light is NOT required to be LIT for the current plant conditions.

ANSWER: D.

Source: Braidwood - 84

REFERENCES: 2OM-6.4.IF pg. 21

Issue 4 Rev. 4

2LP-SQS-1.1

OBJECTIVE: 5

K/A #: 3.03.000.027.EA2.16

K/A IMPORTANCE: 3.6/3.9

Question 2-97-45

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations.
- RCL A NR T-COLD RTD [2RCS*TE412C/D] has failed LOW.
- All procedural and Technical Specification actions for the failed RCL A NR T-COLD RTD are completed.
- PZR Pressure Protection Channel II [2RCS*PT456] subsequently fails HIGH.

Which of the following describes the actions required to be taken for the subsequent PZR Pressure instrument failure?

A. Trip the bistables associated with [2RCS*PT456] IAW 2OM-6.4.IF, Instrument Failure Procedure within 6 hours.

B. Carry out the Immediate Actions for E-0, "Reactor Trip and SI."

C. Restore at least one of the failed instruments to operable status within 1 hour or be in HOT STANDBY within the next 6 hours.

D. Restore at least one of the failed instruments to operable status within 1 hour or be in HOT SHUTDOWN within the following 12 hours.

ANSWER: C.

Source: Braidwood - 80

REFERENCES: U2 TS 3.3.1.1 & 3.0.3

Amendment No. 10/4

2LP-SQS-TS

OBJECTIVE: 1

K/A #: 3.03.000.027.G03

K/A IMPORTANCE: 3.1/3.6

The operators are evaluating a Steam Generator tube leak with the following plant parameters:

- [2CHS-FI150] Letdown flow indicator reads 105 gpm.
- [2CHS*P21A] The A charging pump is the only running charging pump.
- PRZR level is STABLE.
- Seal injection and leakoff flows are NORMAL.
- Charging flow is 110 gpm.
- Identified RCS leakage is 0.9 gpm.
- [2CHS*FCV122] Charging Flow Control Valve is in AUTO.

Which of the following is the approximate amount of primary to secondary leakage?

A. 4 gpm.

B. 5 gpm.

C. 19 gpm.

D. 29 gpm.

ANSWER: C.

Source: Byron - 91

REFERENCES: 2OM Figure 7-1A

Rev. 6

2LP-SQS-7.1

OBJECTIVE: 4

K/A #: 3.03.000.037.EA2.12

K/A IMPORTANCE: 3.3/4.1

Question 2-97-47

W th normal letdown in service, which of the following methods should be ·.tilized to control PRZR level and the ruptured S/G water level when performing a Post S/G Tube Rupture Cooldown IAW ES-3.1, "POST-SGTR COOLDOWN USING BACKFILL"?

1. Raise charging flow to raise PRZR level to 76%, isolate charging flow to allow PRZR level to drop to no less than 14%, and continue to repeat this process.
2. Adjust charging flow as necessary to maintain PRZR level between 14% and 76%, but maintain greater than 30 gpm charging flow.
3. Feed the ruptured S/G to 70%, minimize feed flow and allow the ruptured S/G water level to drain to no less than 23%, and continue to repeat this process.
4. Maintain a constant feed rate to the ruptured S/G such that the ruptured S/G water level is maintained at approximately 33%.

A. 1 and 3.

B. 2 and 3.

C. 1 and 4.

D. 2 and 4.

ANSWER: B.

Source New

REFERENCES: 2OM-53.B.4.ES-3.1 Steps 6-8

Issue 1B, Rev. 3

2LP-SQS-53A.1

OBJECTIVE: 6

K/A #: 3.03.000.038.EA1.39

K/A IMPORTANCE: 3.6/3.7

Question 2-97-48

When carrying out the actions of E-3, "Steam Generator Tube Rupture", an RCS cooldown is conducted prior to depressurizing the RCS.

The temperature at which this initial RCS cooldown is terminated is based on the _____ S/G pressure(s) and ensures...

A. INTACT; the Technical Specification cooldown rate limit is NOT exceeded.

B. RUPTURED; the Technical Specification cooldown rate limit is NOT exceeded.

C. RUPTURED; that when the RCS is subsequently depressurized, adequate RCS subcooling is maintained.

D. INTACT; that when the RCS is subsequently depressurized, adequate RCS subcooling is maintained.

ANSWER: C.

Source: New

REFERENCES: 2OM-53B.4.E-3 Step 15

Issue 1B Rev. 5

2LP-SQS-53A.1

OBJECTIVE: 3

K/A #: 3.03.000.038.EK3.06

K/A IMPORTANCE: 4.2/4.5

Question 2-97-49

Given the following:

- The Unit was operating at 100% power with all systems in their at-power, NSA configurations.
- Pressurizer Pressure Protection Channel I [2RCS*PT455] was declared inoperable and taken out of service with the appropriate bistables placed in the tripped condition.
- The controlling pressurizer pressure channel [2RCS*PT444] then fails HIGH.

Assuming no operator action, which of the following describes the plant response to this subsequent instrument failure?

A. ALL three PZR PORVs and BOTH PZR spray valves OPEN resulting in a LOW PZR Pressure Rx Trip and SI.

B. The reactor will trip immediately on HIGH PZR and a subsequent SI will actuate on LOW PZR Pressure due to the PZR spray valves OPENING.

C. ALL PZR heaters will turn OFF and BOTH PZR spray valves will OPEN resulting in a LOW PZR Pressure Rx Trip and SI.

D. ALL PZR PORVs and spray valves remain CLOSED and all PZR heaters are turned OFF.

ANSWER: C.

Source: R-LOT - 0172

REFERENCES: 2OM-6.4.IF pg. 23

Issue 4 Rev. 4

2LP-SQS-6.4

OBJECTIVE: 12

K/A #: 3.03.010.000.K6.01

K/A IMPORTANCE: 2.7/3.1

Question 2-97-50

If the Unit was operating at 100% power and Grid frequency dropped to 59.5 Hertz, the Rx core CHF will _____, and DNBR will _____.

A. drop, drop

B. drop, raise

C. raise, drop

D. raise, raise

ANSWER: A.

REFERENCES: LP-TMO-7 pg. 30

2LP-TMO-7

K/A #: 3.04.003.000.K5.01

Source: North Anna - 21

Rev. 6

OBJECTIVE: 11 & 12

K/A IMPORTANCE: 3.3/3.9

Question 2-97-51

Given the following:

- There is a Small Break LOCA inside Containment.
- All systems responded as designed.
- All S/G Pressures are ~1000 psig.
- RCS Pressure is 1480 psig and dropping slowly.
- Containment Pressure is 12 psig.

Which of the following describes the reason the RCP's must be tripped?

A. To prevent excessive depletion of RCS inventory which could lead to severe core uncovery.

B. To prevent RCP motor bearing damage due to the loss of cooling.

C. To prevent an RCP seal failure due to the loss of the seal water return flowpath.

D. To prevent RCP motor damage due to the high temperature, high humidity operating environment of the containment.

ANSWER: B. Source: Braidwood - 52

REFERENCES: 2OM-53A.1.E-0 Left Hand Pg. Issue 1B Rev. 3

2LP-SQS-53A.1 OBJECTIVE: 3

K/A #: 3.04.003.000.K6.04 K/A IMPORTANCE: 2.8/3.1

Given the following:

- The Unit is operating in Mode 5 with the PZR water solid.
- The A Train of RHR is in service maintaining RCS temperature.
- All letdown orifice isolation valves are open.
- Letdown from RHR via RHR Letdown Flow Control Valve [2CHS*HCV142] is in service.
- The A Train Charging Pump [2CHS*P21A] is in service.
- Letdown Pressure Control Valve [2CHS-PCV145] is inadvertently CLOSED.

Which of the following describes the plant response as a result of the closure of [2CHS-PCV145]?

A. The A Train RHR flow will DROP due to the valve closure, RCS pressure will RISE due to the resulting heatup.

B. The RCS Pressure will DROP due to total letdown flow being greater than charging flow.

C. RCS pressure will RISE due to continued charging flow until the Cold Overpressure Protection System (OPPS) actuates.

D. There will be NO effect on the RCS because auto control of charging flow will maintain balanced conditions between letdown and charging.

ANSWER: C.

Source: Byron - 37

REFERENCES: OM Figure 7-1A

Issue Rev. 7

2LP-SQS-7.1

OBJECTIVE: 4

K/A #: 3.04.005.000.K5.05

K/A IMPORTANCE: 2.7/3.1

Question 2-97-53

During plant operation with reactor power at 85%, the following events occur:

- Annunciator [A2-4F] "REACTOR COOLANT PUMP OIL TROUBLE" actuates, for the 21A RCP due to a low bearing oil reservoir level.
- Annunciator [A2-4E] "RCP MTR BRG TEMP-TR448B HIGH" actuates due to a HIGH 21A motor bearing temperature.
- All CCP and seal injection flows to the RCPs are normal.
- 21A Reactor Coolant Pump (RCP) motor bearing temperature is 201°F and RISING at a rate of 5°F/min.

Which of the following describes the required operator action?

A. Reduce Rx power to <30%, then STOP 21A RCP.

B. Reduce Rx power to <10%, then STOP 21A RCP.

C. Immediately STOP 21A RCP, then trip the Rx.

D. Immediately Trip the Rx, then STOP 21A RCP.

Provide the following references: ARPs for [A2-4E] 2OM-6.4.AAB & [A2-4F] 2OM-6.4.AAC

ANSWER: D. Source: M-LOT - 0802

REFERENCES: 2OM-6.4.AAB pg. 8 Issue 4 Rev. 1

2LP-SQS-6.3 OBJECTIVE: 12

K/A #: 3.04.000.015.EA2.10 K/A IMPORTANCE: 3.7/3.7

The Unit is operating at 100% power with all systems in their at-power, NSA configurations when the following annunciators are received:

- [A2-4D] REACTOR COOLANT PUMPS SEAL TROUBLE;
  - Computer point reveals the A Loop RCP [2RCS*P21A] to have a LOW seal leakoff flow.

- [A2-5D] REACTOR COOLANT PUMP SEAL VENT POT LEVEL HIGH/LOW;
  - Computer point reveals the A Loop RCP [2RCS*P21A] to have a HIGH seal vent pot level.

The NCO reports the following additional information on the A Loop RCP [2RCS*P21A]:

- No. 1 seal leakoff flow is 0.4 gpm.
- Seal water outlet temperature is 140°F and STABLE.
- Bearing outlet temperature is 145°F and STABLE.

Based on the above information, which of the following events has occurred to the A Loop RCP [2RCS*P21A]?

A. #2 Seal has failed open.

B. #2 Seal has failed closed.

C. #1 Seal has failed open.

D. #1 Seal has failed closed.

ANSWER: A. Source: Zion - 123

REFERENCES: 2OM-6.4.AAE.B/7.4.AAH.5 Issue 4/1 Rev. 7/16

2LP-SQS-6.3 OBJECTIVE: 4.e

K/A #: 3.04.000.015.EK2.07 K/A IMPORTANCE: 2.9/2.9

Given the following:

- The Unit is at full power with all systems in their at-power, NSA configurations.
- An Automatic Safety Injection occurs.
- The operators are in E-0, Rx Trip or Safety Injection Response, at Step 11, "Verify SI Status."
- RCS pressure is 105 psig.
- The following indications are observed on the A Train LHSI Pump [2SIS*P21A]:
  - The Pump Control Switch is in Auto.
  - Motor Amps are fluctuating between 10 amps and 30 amps.
  - LHSI Injection Flow Meter is fluctuating between 0 and 1800 gpm.

The A Train LHSI Pump [2SIS*P21A] is…

A. operating at runout conditions and the pump discharge valve [2SIS*MOV8888A] should be throttled CLOSED.

B. operating as designed, the pump miniflow valve [2SIS*MOV8890A] is cycling due to the RCS being at saturation conditions.

C. cavitating and the pump suction valve [2SIS*MOV8809A] should be verified OPEN.

D. cavitating and the Recirc Pump Discharge to Safety Injection Header valve [2SIS*MOV8811A] should be verified OPEN.

ANSWER: C.

Source: New

REFERENCES: 20M Figure 11.1

Issue Rev. 6

2LP-SQS-11.1

OBJECTIVE: 8

K/A #: 3.04.000.025.EA1.09

K/A IMPORTANCE: 3.2/3.1

Question 2-97-56

The following plant conditions exist:

- The Unit was at 100% power.
- A loss of ALL Offsite AC Power has occurred.
- T_{ave} is 538°F.
- T_{cold} is at 535°F.
- T_{hot} is at 541°F.
- The average of the 10 hottest CET's is 548°F.
- PZR pressure is 2160 psig.

Which of the following is the current RCS subcooling?

A. 93°F.

B. 100°F.

C. 107°F.

D. 110°F.

ANSWER: B. Source: Zion - 97

REFERENCES: Steam Tables Issue Rev.

1/2LP-NOMCD-1.1 OBJECTIVE: 8

K/A #: 3.04.000.074.EK1.01 K/A IMPORTANCE: 4.3/4.7

Given the following:

- The unit is operating at 60% power, steady state conditions with ALL systems in their at-power, NSA configurations.
- Control bank D rods are in AUTO at 190 steps.

The following indications are then observed:

- All S/G Steam Flows, Feed Flows and Water Levels RISE, and then return to their original values.
- T_{ave} DROPS and then returns to its original value.
- Rx power as indicated on Recorder [2NME-NR45] RISES and then returns to its original value.
- Control rods move OUT rapidly and then slowly step in to approximately their original positions.

Which of the following would cause the above listed conditions?

A. The Main Steam Residual Heat Release Valve [2SVS*HCV104] has failed OPEN.

B. The #4 Main Turbine Governor Valve [2TMS-GV4] has failed OPEN.

C. The HP Turbine Impulse Pressure Transmitter [2MSS*PT446] has failed HIGH.

D. Power Range Nuclear Instrument channel [2NMP-NI44B] has failed LOW.

ANSWER: B.

Source: Braidwood - 73

REFERENCES: LP-ATA-3.1

Rev. 0

2LP-SQS-ATA-3.1

OBJECTIVE: 1 & 2

K/A #: 3.04.035.010.K5.01

K/A IMPORTANCE: 3.4/3.9

Question 2-97-58

With the Unit operating at 100% power and all systems in their at-power, NSA configurations, which of the following statements describes the response of a main feedwater break as compared to a steamline break?

A. A feedline break will cause the affected S/G to depressurize BEFORE the Rx Trip; for a steamline break the affected S/G will depressurize AFTER the Rx Trip.

B. A feedline break will blowdown ALL S/Gs until the FW isolation occurs; a steamline break will only blow down one S/G.

C. The initial primary response to a feedline break is a RISE in T_{ave}; for a steamline break T_{ave} continuously DROPS.

D. The initial secondary response to a feedline break will be a RISE in main generator load; for a steamline break load will remain the same.

ANSWER: C.

Source: Byron - 69

REFERENCES: ATA LP-4.1 & 4.3

Rev. 0

2LP-SQS-ATA-4.1 & 4.3

OBJECTIVE: 1 and 2

K/A #: 3.05.000.040.EA2.01

K/A IMPORTANCE: 4.2/4.7

Question 2-97-59

Given the following:

- The Unit was operating at 100% power with all systems in their at-power, NSA configurations when a Rx Trip and Safety Injection occurred.
- 'A' S/G pressure is DROPPING rapidly.
- 'A' S/G steam flow is 2.5E6 lbm/hr.
- RCS cold leg temperature is 180°F and DROPPING.
- Containment Pressure is 8.5 psig and RISING.
- All MSIVs and Bypass Valves are CLOSED.

Assuming all ESF Equipment functioned as designed and NO operator action, which Critical Safety Function is of the MOST concern?

A. Subcriticality

B. Heat Sink

C. RCS Integrity

D. Containment

ANSWER: C. Source: Zion - 82

REFERENCES: 2OM-53A.1.E-0 Left Hand Pg. Issue 1B Rev. 3

2LP-SQS-53A.1 OBJECTIVE: 6

K/A #: 3.05.000.040.EK1.06 K/A IMPORTANCE: 3.7/3.8

Question 2-97-60

The Unit has experienced a Reactor Trip and Safety Injection due to a S/G Tube Rupture on the 'A' S/G. The SGTR procedure E-3 is in effect and the operators are about to commence an RCS cooldown at the maximum rate. The following conditions exist:

- 'A' S/G Level is 65% Narrow Range and RISING.
- 'A' S/G Steam Line Radiation Monitor [2MSS*RQI101A] is in Alarm.
- RCS T_{ave} is 540°F and stable.
- Main Condenser Vacuum is 15" Hg absolute and stable.
- B and C Circ Water Pumps have tripped.
- A and D Circ Water Pumps are running.

Which of the following actions are necessary to conduct the RCS cooldown IAW E-3 "S/G Tube Rupture"?

A. Take the Steam Dumps to the Steam Pressure Mode and manually OPEN the Steam Dumps.

B. Take the Steam Dumps to the Steam Pressure Mode, take BOTH Steam Dump Bypass Selector Switches momentarily to DEFEAT TAVG position, and then manually OPEN the Steam Dumps.

C. Manually OPEN the B and C S/G Atmospheric Steam Dump Valves [2SVS*PCV101B&C].

D. Manually OPEN ALL S/G Atmospheric Steam Dump Valves [2SVS*PCV101A,B&C].

ANSWER: C. Source: Zion - 25

REFERENCES: 20M-53A.1.E-3.14.c RNO Issue 1B Rev. 5

2LP-SQS-53A.1 OBJECTIVE: 6

K/A #: 3.05.000.051.EK3.01 K/A IMPORTANCE: 2.8/3.1

Question 2-97-61

Given the following:

- Reactor power is 90%.
- RCS T_{avg} is 574°F and slowly rising on all 3 loops.
- RCS pressure is stable at 2235 psig.
- Steam Flow on each S/G is 3.78 E6 lbm/hr.
- 'C' S/G feed flow is off scale HIGH.
- 'C' S/G pressure is STABLE
- 'C' S/G Main Feed Reg Valve [2FWS*FCV498] is full OPEN.
- 'C' S/G level is DROPPING.
- Containment pressure and humidity are RISING.

Which of the following events is in progress.

A. 'C' S/G Main Feed Reg Valve [2FWS*FCV498] has failed OPEN.

B. 'C' S/G Feed Flow Indicator has failed HIGH.

C. 'C' S/G Feed Line Break INSIDE Containment.

D. The 'A' Main Feed Pump [2FWS-P21A] has TRIPPED.

ANSWER: C. Source: Braidwood - 108

REFERENCES: 2OM-53.B.4.E-2 pg. 3 Issue 1B Rev. 2

2LP-SQS-24.1 OBJECTIVE: 5

K/A #: 3.05.000.054.EK1.01 K/A IMPORTANCE: 4.1/4.3

Question 2-97-62

The Unit is operating at 80% power with all systems in their at-power, NSA configurations. One condenser TCV steam dump valve fails full OPEN. Assuming that NO operator action or automatic runback occurs, what will be the resulting Rx power level?

A. Zero

B. 80%

C. 85%

D. 90%

ANSWER: C.

Source: M-LOT - 0590

REFERENCES: 2OM 21.1.C pg. 5

Issue 4 Rev. 4

2LP-SQS-21.1

OBJECTIVE: 5

K/A #: 3.05.039.000.A2.05

K/A IMPORTANCE: 3.3/3.6

Question 2-97-63

During the performance of FR-S.1, "Response to Nuclear Power Generation - ATWS" immediate action step 4, 'Close Condenser Steam Dump Valves', the operator places ONLY the Train 'A' Steam Dump Bypass Selector Switch to the 'OFF' position (Train 'B' switch was left in the 'ON' position). Which of the following describes the Steam Dump system response?

A. The first two banks of valves will CLOSE, but the last two banks are still ARMED.

B. The last two banks of valves will CLOSE, but the first two banks are still ARMED.

C. ALL banks of valves CLOSE and are BLOCKED from actuating.

D. NO banks of valves CLOSE and ALL are ARMED for operation.

ANSWER: C.

REFERENCES: 2OM-21.5.A.12

2LP-SQS-21.1

K/A #: 3.05.041.020.A4.08

Source: LOT - 0023

Issue 4 Rev. 0

OBJECTIVE: 3

K/A IMPORTANCE: 3.0/3.1

Question 2-97-64

Which of the following describes how the reactor protection system senses a Turbine Trip signal?

1. Low Emergency Trip Header Pressure, 2/3 channels <1000 psig.
2. Turbine Governor Valves SHUT on 4/4 governor valves.
3. Low Turbine Impulse Pressure 1/2 channels < 100 psig.
4. Turbine Throttle (Stop) Valves SHUT on 4/4 Stop Valves.

A. 1 and 2

B. 1, 2, 3

C. 1 and 4

D. 2 and 4

ANSWER: C.

Source: M-LOT - 0524

REFERENCES: TS Tables 3.3-1 & 2.2-1

Amendment No. 27/27

2LP-SQS-1.1

OBJECTIVE: 5

K/A #: 3.05.045.050.K1.01

K/A IMPORTANCE: 3.4/3.6

Question 2-97-65

The Unit is operating at 100% power with all systems in their at-power, NSA configurations when an EHC equipment failure caused a rapid load rejection down to ~40% power.

In response to this rapid load rejection, the Condensate Feedwater Heater Bypass Valve [2CNM-AOV100] will automatically OPEN...

A. if a low main feed pump suction pressure is detected and will automatically CLOSE once normal pressure has been restored.

B. if a low main feed pump suction pressure is detected and may be manually CLOSED after a four minute time delay.

C. on a C7B signal and will automatically CLOSE once normal pressure has been restored.

D. on a C7B signal and will automatically CLOSE after four minutes has elapsed following the load rejection.

ANSWER: D. Source: M-LOT - 0411

REFERENCES: OM Figure 22A-12 & 23B-11 Rev. 7

2LP-SQS-22A.1 OBJECTIVE: 4

K/A #: 3.05.056.000.K1.03 K/A IMPORTANCE: 2.6/2.6

The Unit is operating at 95% power with all systems in their at-power, NSA configurations. The steam pressure input to the 'B' S/G water level control (SGWLC) system fails LOW. Which of the following describes the plant response to this instrument failure?

A. There will be NO effect to the SGWLC system due to the median select design feature.

B. 'B' S/G Main Feed Reg Valve [2FWS*FCV488] throttles CLOSED to maintain 33% level.

C. 'B' S/G Main Feed Reg Valve [2FWS*FCV488] initially throttles OPEN and then CLOSED to maintain 44% level.

D. 'B' S/G Main Feed Reg Valve [2FWS*FCV488] initially throttles CLOSED and then OPEN to maintain 44% level.

ANSWER: D.

Source: M-LOT - 0195

REFERENCES: 2OM-24.1.D pg. 5

Issue 4 Rev. 2

2LP-SQS-24.1

OBJECTIVE: 5

K/A #: 3.05.059.000.A2.11

K/A IMPORTANCE: 3.0/3.3

Given the following:

- The Unit was operating at 100% power with all systems in their at-power, NSA configurations when Grid instabilities caused a Unit Trip.
- All systems functioned as designed EXCEPT that an 'A' S/G AFW flow control valve [2FWE*HCV100E] is mechanically bound in the full OPEN position.
- 'A' S/G Wide Range Water Level is now 78% and RISING.

Which of the following should be done to prevent overfilling the 'A' S/G yet maintain an adequate Heat Sink?

1. Throttle CLOSED the other 'A' S/G AFW flow control valve [2FWE*HCV100F].
2. STOP the 'A' Train Motor Driven AFW Pump [2FWE*P23A].
3. STOP the 'B' Train Motor Driven AFW Pump [2FWE*P23B].
4. STOP the Steam Driven AFW Pump [2FWE*P22].

A. 1 ONLY.

B. 1, 2 and 4.

C. 2 and 3.

D. 3 and 4.

ANSWER: B.

Source: New

REFERENCES: OM Figure 24-3

Issue Rev. 7

2LP-SQS-24.1

OBJECTIVE: 7

K/A #: 3.05.061.000.A2.07

K/A IMPORTANCE: 3.4/3.5

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations EXCEPT that the 'A' Train Service Water Pump [2SWS*P21A] is being put on Clearance for motor replacement.
- [2SWS*P21A] 4KV breaker has been racked out and tagged OPEN.
- The 'B' and 'C' Service Water Pumps [2SWS*P21B] and [2SWS*P21C] are running.
- Upon review of the Clearance paperwork it was noted that when performing the Clearance, the operator inadvertently racked the Swing Service Water Pump [2SWS*P21C] onto the 2DF 4KV bus instead of the 2AE 4KV bus.

What are the Technical Specification implications for the Swing Service Water Pump [2SWS*P21C] being powered from the wrong 4KV bus?

A. There are NO Technical Specification implications provided at least one Standby Service Water Subsystem is OPERABLE.

B. Both trains of Service Water may be considered OPERABLE based on the provisions of Technical Specification 3.0.5.

C. Establish the 2AE 4KV bus as the power supply to [2SWS*P21C] within one hour or be in HOT STANDBY within the next six hours.

D. Establish the 2AE 4KV bus as the power supply to [2SWS*P21C] within 72 hours or be in HOT STANDBY within the next six hours.

Provide the following references: TSs 3.0.3, 3.0.5, 3.7.4.1 and 3.7.13.1.

ANSWER: D.

Source: New

REFERENCES: TS 3.7.4.1

Issue Rev.

2LP-SQS-TS

OBJECTIVE: 1

K/A #: 3.05.076.000.G05

K/A IMPORTANCE: 2.8/3.2

Under which of the following conditions would the Containment Integrity Technical Specification be satisfied?

NOTE: Assume there are NO blank flanges or pipe caps installed on equipment that is disassembled or removed.

A.
- 21A S/G Blowdown isolation valve [2BDG*AOV101A1] is REMOVED,
- 21A S/G Blowdown isolation valves [2BDG*AOV101A2] and [2BDG*465] are CLOSED and
- Drain valve [2BDG*547] is OPEN with the pipe cap removed.

B.
- Containment Equipment Hatch installed with three closure bolts, and
- BOTH doors on the Emergency Personnel Access Hatch are CLOSED, and
- All containment purge dampers are CLOSED.

C.
- CCP return header relief valve [2CCP*RV105] is removed,
- CCP return header isolation valve [2CCP*MOV157-2] is CLOSED, and [2CCP*MOV157-1] is OPEN and
- Drain valve [2CCP*926] is OPEN with the pipe cap removed.

D.
- The CVCS charging line is removed from the Regen Heat Exchanger,
- Charging Header vent valve [2CHS-730] is locked OPEN,
- Charging Header Isolation valve [2CHS*MOV289] is OPEN, and
- Charging Header Manual Isolation valves [2CHS*30] and [2CHS*477] are CLOSED.

Provide the following references: VOND Figures; 7-1A Rev. 6, 15-3 Rev. 2 and 25-1 Rev. 9.

ANSWER: A.

Source: M-1-97-057

REFERENCES: 2OM Figures 7-1A, 15-3 and 25-1.

Issue Rev. 6, 2 and 9

2LP-SQS-TS

OBJECTIVE: 1

K/A #: 3.06.000.069.G08

K/A IMPORTANCE: 3.4/4.1

Question 2-97-70

A Large Break Loss of Coolant Accident has occurred where ALL ESF equipment functioned as designed EXCEPT that the 'B' Header Recirculation Spray HX Service Water Supply Isolation Valve [2SWS*MOV103B] has failed CLOSED. What impact will this failure have on the containment depressurization system?

Containment pressure will _____ its design limit and will…

A. exceed; take longer than one hour to return to subatmospheric conditions.

B. exceed; return to subatmospheric conditions within one hour.

C. NOT exceed; take longer than one hour to return to subatmospheric conditions.

D. NOT exceed; return to subatmospheric conditions within one hour.

ANSWER: D. Source: New

REFERENCES: 2OM-13.1.A pg. 1 & single failure criteria. Issue 4 Rev. 0

2LP-SQS-13.1 OBJECTIVE: 1

K/A #: 3.06.022.000.K3.02 K/A IMPORTANCE: 3.0/3.3

Question 2-97-71

A large break loss of coolant accident has occurred inside containment. The 2AE 4KV tie breaker to the 2N 480v bus [ACB-2E11] has tripped and CANNOT be closed.

The Transfer to Recirculation signal is now present. Which of the following describes how the recirculation components will be affected?

A. No effect, ALL components will function as designed due to the auto transfer of the 2N bus feed from the 2AE bus to the 2P bus.

B. Transfer to Recirculation will NOT occur because Recirculation Spray pumps [2RSS*P21A&C] are deenergized.

C. Transfer to Recirculation will occur on 'B' Train components ONLY because the 'A' Train motor operated valves are deenergized.

D. RSS pump [2RSS*P21A] will NOT supply the LHSI Header due to RSS pump discharge isolation valve [2RSS*MOV156A] being deenergized.

ANSWER: C. Source: New

REFERENCES: 2OM-37.5.B.7 Table 37.7 pg. 38-132 & Fig. 10080-RE-1C Issue 4 Rev. 7

2LP-SQS-11.1 OBJECTIVE: 6 and 11

K/A #: 3.06.026.000.K2.02 K/A IMPORTANCE: 2.7/2.9

Question 2-97-72

A large break loss of coolant accident has occurred inside containment.

The 'B' Train Hydrogen Analyzer [2HCS*HA100B]…

A. will receive an automatic start signal from the Train 'B' SIS signal.

B. will automatically start after a time delay if [2HCS*HA100A] fails to achieve adequate sample flow.

C. must be manually started from the Control Room when directed in the EOP network.

D. must be manually started from its local Control Panel when directed in the EOP network.

ANSWER: A.

REFERENCES: 2OM-46.1 pg. 1

2LP-SQS-46.1

K/A #: 3.06.028.000.A4.03

Source: New

Issue 1 Rev. 5

OBJECTIVE: 5

K/A IMPORTANCE: 3.1/3.3

Given the following conditions:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations.
- A large, audible in-leakage is reported at the equipment hatch around the containment seal.

Which of the following describes the action to be taken?

A. Quantify the in-leakage so the exact amount is known.

B. Reduce power to less than 50% until the leak is repaired.

C. Restore containment integrity within 24 hours or be in HOT STANDBY within the next 6 hours.

D. Restore containment integrity within 1 hour or be in HOT STANDBY within the next 6 hours.

ANSWER: D.

Source: North Anna - 53

Amendment No. 80

REFERENCES: TS 3.6.1.3

2LP-SQS-TS

OBJECTIVE: 1

K/A #: 3.06.103.000.K3.02

K/A IMPORTANCE: 3.8/4.2

Question 2-97-74

The Unit was operating at 100% power with all systems in their at-power, NSA configurations when a loss of offsite power occurred. The ED/Gs start and energize the AC emergency buses. A Natural Circulation cooldown is being performed IAW ES-0.2 "Natural Circulation Cooldown." The following major action steps have been accomplished:

- Cold shutdown boron concentration has been verified,
- Two CRDM fans are running,
- RCS cooldown to cold shutdown has been initiated.

At this point, RCS hot leg temperatures are checked to determine if they are less than 550°F.

What is the purpose of this RCS hot leg temperature check at this point in the procedure?

A. To determine if the RCS cooldown has resulted in steam void formation in the upper head of the reactor vessel.

B. To verify that natural circulation flow still exists between the core and the S/Gs.

C. To verify that the RCS cooldown has not resulted in a challenge to the RCS integrity critical safety function.

D. To ensure that at least 50°F RCS subcooling will be maintained during the subsequent depressurization when the SI circuits are blocked.

ANSWER: D. Source: New

REFERENCES: 20M-53B.4.ES-0.2 Step 7 Issue 1B Rev. 3

2LP-SQS-53A.1 OBJECTIVE: 3

K/A #: 3.07.000.055.EA1.01 K/A IMPORTANCE: 3.7/3.9

Question 2-97-75

During the performance of ECA-0.0 "Loss of All AC Power", a rapid S/G depressurization to 300 psig is performed to reduce RCS temperature and pressure.

The bases for STOPPING the S/G depressurization at 300 psig is to ensure that…

A. the maximum Technical Specification cooldown rate is NOT exceeded.

B. a steam void will NOT be created in the Rx vessel head.

C. the challenge to the RCS Integrity Critical Safety Function is limited to that assumed in the Accident Analysis.

D. RCS pressure is maintained above the minimum pressure to preclude injection of accumulator N2 into the RCS.

ANSWER: D. Source: New

REFERENCES: 2OM-53.B.4.ECA-0.0 pg. 116 Issue 1B Rev. 3

2LP-SQS-53A.1 OBJECTIVE: 3

K/A #: 3.07.000.055.EK3.02 K/A IMPORTANCE: 4.3/4.6

The Unit was operating at 100% power with all systems in their at-power, NSA configurations when an electrical fault caused a Loss of Offsite Power condition. The following conditions are noted on the #1 Emergency Diesel Generator [2EGS*EG2-1]:

- Generator Output Watts - 4150 KW
- Generator Power Factor - 0.9 lagging
- Generator Output Voltage - 4180 volts

Which of the following indicates the MAXIMUM amount of time that the #1 EDG can operate under the given circumstances?

A. Shutdown immediately.

B. 30 minutes.

C. 160 hours.

D. No limitation on run time.

ANSWER: D.

Source: Braidwood - 110

REFERENCES: 20M-36.1C pg. 5

Issue 4 Rev. 2

2LP-SQS-36.2

OBJECTIVE: 1

K/A #: 3.07.000.056.EA2.50

K/A IMPORTANCE: 2.8/3.1

Question 2-97-77

The Unit was operating at 100% power with all systems in their at-power, NSA configurations when a loss of 120 VAC Vital Bus III occurred. Which of the following will require expeditious manual operator control action to prevent a Rx Trip?

A. Pressurizer Level.

B. Pressurizer Pressure.

C. S/G Feed Flow.

D. Main Turbine Load.

ANSWER: C.

Source: Byron - 75

REFERENCES: 2OM-38.4.V pg. 1 Caution

Issue 1 Rev. 5

2LP-SQS-38.1

OBJECTIVE: 8.h

K/A #: 3.07.000.057.EA1.06

K/A IMPORTANCE: 3.5/3.5

The reactor is critical at 103 CPS in the source range. The 120 VAC Vital Bus II inverter output breaker tripped OPEN. This causes the Vital Bus II to be deenergized.

A reactor trip will occur due to the loss of power to…

A. SSPS Train 'B' Logic Cabinet.

B. SR channel N-32.

C. IR channel N-35.

D. PR channel N-42.

ANSWER: B.

REFERENCES: 2OM-2.3.C pg. 4

2LP-SQS-2.1

K/A #: 3.07.000.057.EA2.19

Source: Braidwood - 91

Issue 4 Rev. 2

OBJECTIVE: 6

K/A IMPORTANCE: 4.0/4.3

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations EXCEPT;
  - The 'A' Charging Pump [2CHS*P21A] is NOT running but its breaker IS racked onto the 2AE bus.
  - The 'C' Charging Pump [2CHS*P21C] is running on the 2AE bus.
- A loss of DC control power has occurred to the 2AE bus.
- While stabilizing the unit, a spurious SI occurred.

Which of the following pump combinations will exist as a result of these failures?

	[2CHS*P21A]	[2CHS*P21B]	[2CHS*P21C]
A.	Stopped	Running	Stopped
B.	Stopped	Running	Running
C.	Running	Running	Stopped
D.	Running	Stopped	Running

ANSWER: B.

Source: North Anna - 95

REFERENCES: [2CHS*P21] E-DWG

Issue Rev.

2LP-SQS-7.1

OBJECTIVE: 7

K/A #: 3.07.000.058.EA2.03

K/A IMPORTANCE: 3.5/3.9

Question 2-97-80

The Unit is operating at 100% power with all systems in their at-power, NSA configurations. Under which of the following conditions would the System Station Service Transformer (SSST) Normal 4KV Infeed Breaker [ACB-42A] CLOSE?

A. The Live Bus Transfer Switch is placed in the ON position with the SSST Normal 4KV Infeed Breaker [ACB-42A] set up for auto transfer.

B. The Unit SST Normal 4KV Infeed Breaker [ACB-42C] trips OPEN on an OVERCURRENT fault.

C. The Unit SST Normal 4KV Infeed Breaker [ACB-42C] is Manually OPENED from BB-C.

D. The Live Bus Transfer Switch is placed in the ON position and the control switch for [ACB-42A] is placed in the CLOSE position.

ANSWER: D.

Source: New

REFERENCES: 2OM-36.1.E pg. 30

Issue 4 Rev. 4

2LP-SQS-36.1

OBJECTIVE: 6

K/A #: 3.07.062.000.K4.03

K/A IMPORTANCE: 2.8/3.1

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations.
- EDG No. 2-1 is running unloaded to cooldown following the monthly OST.
- A Loss of the DC SWBD 2-1 has occurred.

Which of the following actions will STOP the 2-1 EDG?

A. The EDG will STOP automatically when the DC SWBD 2-1 loses power.

B. Simultaneously depressing BOTH of the EDG STOP pushbuttons on BB-C.

C. Depressing the EDG STOP pushbutton on the Local EDG control panel.

D. Placing the mechanical governor lever on the EDG fuel racks to the STOP position.

ANSWER: D. Source: Zion - 3, Modified

REFERENCES: OM Figure 36-3 & 12241-E-12H,J,K&L Revs. 9,7,8,8,2.

2LP-SQS-36.1 OBJECTIVE: 6

K/A #: 3.07.063.000.K3.01 K/A IMPORTANCE: 3.7/4.1

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations when a loss of offsite power occurs, at 10:00:00.
- A spurious safety injection signal is generated at the same time.
- The operators are responding to the transient IAW E-0 "Reactor Trip or Safety Injection."
- At 10:02:10 the AFW pump status is checked; the turbine driven AFW pump [2FWE*P22] is running, but the motor-driven AFW pumps [2FWE*P23A&B] are NOT running.

The Motor Driven AFW Pumps [2FWE*P23A&B] should...

A. NOT be running, the EDG sequencers will NOT start the motor-driven AFW pumps for another 10 seconds.

B. NOT be running, the motor-driven AFW pumps will NOT start automatically unless the turbine-driven AFW pump fails to start.

C. be running, the motor-driven AFW pumps should have started immediately upon the trip of the second main feedwater pump.

D. be running, the EDG sequencers should have already started the motor-driven AFW pumps.

ANSWER: D.

Source: M-LOT - 0232

REFERENCES: 2OM-36.1.C pg. 14-15, TS 3.3.2.1 Table 3.3.5

Issue 4 Rev. 2

2LP-SQS-24.1

OBJECTIVE: 10

K/A #: 3.07.064.000.K4.11

K/A IMPORTANCE: 3.5/4.0

Under which of the following situations should the station air to containment instrument air cross tie valve [2IAC-MOV131] be directed to be OPENED?

A. Only ONE Containment Instrument Air Compressor is operational.

B. The normal containment instrument air containment isolation valve [2IAC*MOV130] is failed CLOSED.

C. Following a Main Steam Line break inside containment actuating an automatic Safety Injection.

D. Following a Loss of Offsite Power without an SI and the Black Diesel Generator fails to start.

ANSWER: C.

Source: New

REFERENCES: 2OM-53.B.4.ES-1.1 Step 8

Issue 1B Rev. 5

2LP-SQS-53A.1

OBJECTIVE: 6

K/A #: 3.08.000.065.EK3.04

K/A IMPORTANCE: 3.0/3.2

Question 2-97-84

Which of the following indications are available on the Emergency Shutdown Panel (SDP)?

A. Auxiliary Feedwater Flow, Containment Pressure, Charging Flow.

B. RHS HX Outlet Temperature, S/G Wide Range Level, RCS Wide Range Temperature.

C. Pressurizer Level, Rx Trip Breaker Position, Steam Generator Pressure.

D. Letdown Flow, Intermediate Range SUR, Charging Header Pressure.

ANSWER: B.

REFERENCES: 2OST-45.2

2LP-SQS-53C.1

K/A #: 3.08.000.068.EK2.01

Source: Braidwood - 92

Issue 1 Rev. 8

OBJECTIVE: 6

K/A IMPORTANCE: 3.9/4.0

Question 2-97-85

The Unit is operating at 100% power with all systems in their at-power, NSA configurations.

If the Source Range High Voltage (HV) Manual control switch for N-31 is placed in the "ON" position, N-31 High Voltage will ___(1)___, the high flux reactor trip status light will ___(2)___, and a Rx Trip ___(3)___ occur.

	(1)	(2)	(3)
A.	remain OFF	remain OFF	will NOT
B.	turn ON	remain OFF	will NOT
C.	turn ON	turn ON	will NOT
D.	turn ON	turn ON	will

ANSWER: C. Source: R-LOT - 0763

REFERENCES: 2OM-2.1.B pg. 7 & 2OM2.2.5 Issue 4/1 Rev. 12
figure 2-2

2LP-SQS-2.1 OBJECTIVE: 5

K/A #: 3.09.000.032.EA1.01 K/A IMPORTANCE: 3.1/3.4

Question 2-97-86

Which of the following situations would require entry into a Technical Specification Action Statement?

The Unit is ___(1)___ and I&C reports that…

A. at 8% power; the N-35 Hi Flux Trip Bistable setpoint is the current equivalent of 35%.

B. at 1.0 E-8 amps in the IR; ALL EHC Emergency Trip Header Low Pressure Switches were calibrated with a pressure gauge that was out of calibration in the NON-conservative direction.

C. in Mode 1; BOTH Source Range instruments should be declared inoperable due to the failure of the detector cables.

D. in Mode 3; the Turbine Impulse Pressure Transmitter that feeds P-13 should be declared inoperable due to a leaking capacitance bellows assembly.

ANSWER: A.

Source: New

REFERENCES: TS 3.3.1.1

Amendment No. 10

2LP-SQS-TS

OBJECTIVE: 1

K/A #: 3.09.000.033.G08

K/A IMPORTANCE: 2.8/3.4

Question 2-97-87

Given the following:

- A large break loss of coolant accident has occurred in containment.
- All ESF systems have functioned as designed.
- The Containment High Range Area radiation monitors [2RMR*RQ206 & 207] have indicated 5.0 E5 R/Hr for 5 hours.
- Containment radiation levels have subsequently dropped to 5.0 E4 R/Hr.

Which of the following describes the application of Adverse Containment Criteria values?

A. Adverse Containment Criteria have NOT been met throughout this event.

B. Adverse Containment Criteria were in effect, but no longer apply.

C. Adverse Containment Criteria still apply until the integrated dose can be confirmed to be less than 1.0 E6 RADs.

D. Adverse Containment Criteria apply only if containment pressure exceeds 1.0 psig.

ANSWER: C.

Source: New

REFERENCES: 2OM-53B.5.GI-2 Pg. 11

Issue 1B Rev. 0

1/2TP-NOMCD-1.3

OBJECTIVE: 19

K/A #: 3.09.000.061.EK3.02

K/A IMPORTANCE: 3.4/3.6

Question 2-97-88

What are the affects on the Solid State Protection System (SSPS) if the 120vac Vital Instrument Bus III is de-energized?

Assume initial conditions of 100% power, with all systems in their at-power NSA configurations.

A. ALL of the Train B, Output Bay Slave Relays will NOT function on a Safety Injection signal.

B. ONLY the #2 Emergency Diesel Generator Load Sequencer will load the required components on a Safety Injection signal.

C. ALL of the Train B, Input Bay Relays will de-energize resulting in a Rx Trip and Safety Injection.

D. Train B will function as designed due to the auctioneered power supplies to the Logic Bay.

ANSWER: D.

Source: M-1-97-69

REFERENCES: OM Figure 1-41

Issue 1 Rev. 5

2LP-SQS-1.2

OBJECTIVE: 7

K/A #: 3.09.012.000.K1.01

K/A IMPORTANCE: 3.4/3.7

A reactor startup is in progress with IR power at 3.0 E-11 amps. The source range High Flux Trip has NOT been blocked. Which of the following describes the Reactor Protection System response if a CONTROL POWER fuse blows on the N-31 Source Range instrument with the Level Trip Bypass Switch in the positions indicated?

	Level Trip Bypass Switch Position	
	NORMAL	BYPASS
A.	NO Trip	NO Trip
B.	NO Trip	Rx Trip
C.	Rx Trip	NO Trip
D.	Rx Trip	Rx Trip

ANSWER: C.

Source: Braidwood - 17

REFERENCES: OM Figure 2-8

Issue 1 Rev. 3

2LP-SQS-2.1

OBJECTIVE: 3

K/A #: 3.09.015.000.K6.04

K/A IMPORTANCE: 3.1/3.2

Question 2-97-90

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations.
- RCS Tave control channels are indicating as follows:
  - "A" loop - 580°F
  - "B" loop - 582°F
  - "C" loop - 581°F
- "B" loop Tcold instrument begins to slowly fail LOW.

Which of the following describes the response of the Tave Control System to this failure?

As the "B" loop Tave drops, the selected Tave will swap from "C" loop to…

A. "A" loop, then to "B", then finally back to "C"
B. "B" loop, then to "A", then finally back to "C"
C. "B" loop, then to "A" and remains there.
D. "A" loop and remains there.

ANSWER: C.

Source: M-North Anna - 44

REFERENCES: 2OM-6.1.D pg. 18

Issue 4 Rev. 0

2LP-SQS-6.5

OBJECTIVE: 5.a

K/A #: 3.09.016.000.A3.01

K/A IMPORTANCE: 2.9/2.9

The Unit has experienced a LOCA. FR-C.1 "Response to Inadequate Core Cooling" has been implemented. The following conditions exist:

- Core Exit Thermocouple Temperatures are 1350°F and stable.
- Narrow Range RVLIS is 10% and fluctuating.
- Wide Range S/G Levels are less than 10%.

Which of the following describes the condition of the core assuming the above conditions do NOT degrade further during the recovery?

A. No damage has occurred to the fuel or cladding due to CET's remaining < 2200°F.

B. Some localized cladding failure may have occurred; however, core and fuel geometry is intact.

C. Significant cladding and fuel pellet melting has occurred releasing fission products into the RCS.

D. Complete cladding oxidation and fuel melting has occurred in localized areas of the core.

ANSWER: B.

Source: Zion - 114

REFERENCES: LP-NOMCD-1.1 pg. 47

Rev. 0

2LP-SQS-NOMCD-1.1

OBJECTIVE: 11

K/A #: 3.09.017.020.K5.01

K/A IMPORTANCE: 3.1/3.9

Question 2-97-92

Unit 1 and Unit 2 are both at 100% power when a HIGH alarm is received on [2RMC*RQ201] and [2RMC*RQ202], Control Room area radiation monitors. Which of the following is the expected automatic system response to these HIGH alarms?

1. Unit 2 CR ACU Air Intake and Exhaust Dampers [2HVC*MOD201A,B,C,D] receive a CLOSE signal.
2. Unit 1 CR Air Intake and Exhaust Dampers [1VS-D-40-1A,1B,1C,1D] receive a CLOSE signal.
3. The Control Room Emergency Bottled Air Pressurization System is actuated.
4. The Unit 1 and Unit 2 Emergency Ventilation fans start after a 60 minute time delay.

A. 1, 2, and 3

B. 1, 2, and 4

C. 1, 3 ONLY.

D. 2, 3, and 4

ANSWER: A.

Source: M-LOT - 0509

REFERENCES: 2OM-43.5.B.3 pg. 1

Issue 4 Rev. 0

2LP-SQS-43.1

OBJECTIVE: 5

K/A #: 3.09.072.000.K1.04

K/A IMPORTANCE: 3.3/3.5

Given the following:

- The Unit is operating at 100% power with all systems in their at-power, NSA configurations.
- Annunciator [A4-5A] REACTOR COOLANT LETDOWN [2CHS-RQ101A(B)] (LOW RANGE (HIGH RANGE)) ALERT ALARM LEVEL has just been received.

Assuming that the alarm is valid, extremely high radiation levels could exist in all following cubicals EXCEPT the…

A. VCT cubical.

B. NRHX cubical.

C. Blender cubical.

D. LHSI pump cubical.

ANSWER: D.

Source: North Anna - 52

REFERENCES: 2OM-43.4.AAF pg. 1

Issue 1 Rev. 3

2LP-SQS-7.1

OBJECTIVE: 2 and 11

K/A #: 3.09.073.000.A1.01

K/A IMPORTANCE: 3.2/3.5

With the Unit operating at 100% power with all systems in their at-power, NSA configurations, which of the following actions must be taken IAW the ARP for annunciator [A2-5F] REACTOR COOLANT PUMP COOLING WATER TROUBLE if the 2B RCP thermal barrier CCP isolation valve [2CCP*AOV107B] CLOSED on a high flow signal?

A. Within 30 minutes, reduce power to <30% then trip the affected RCP.

B. Check RCP thermal barrier CCP outlet pressure.

C. Immediately Trip the Rx and then trip the affected RCP.

D. Declare [2CCP*AOV107B] INOPERABLE per T.S. 3.6.3.1 "Containment Isolation Valves."

Provide the following references: ARP for [A2-5F] REACTOR COOLANT PUMP COOLING WATER TROUBLE, 2OM6.4.AAG.

ANSWER: B. Source: Braidwood - 5

REFERENCES: 2OM-6.4.AAG pg. 5 Issue 4 Rev. 1

2LP-SQS-6.3 OBJECTIVE: 12

K/A #: 3.10.008.000.K3.01 K/A IMPORTANCE: 3.4/3.5

Question 2-97-95

Given the following conditions:

- The Unit is operating in Mode 5 with all systems in their required lineups for the existing mode.
- Annunciator [A11-10D] AUXILIARY BUILDING SUMP LEVEL HIGH went into alarm 5 minutes ago followed shortly thereafter by Annunciator [A6-1H] PRI COMP COOLING WATER SYSTEM TROUBLE.
- The NCO notices that CCP surge tank level is slowly DROPPING.

Which of the following could be the location of the CCP leak?

A. RHR HX

B. CCP HX

C. Excess L/D HX

D. RCP Motor Cooler.

ANSWER: B.

REFERENCES: 2OM Figure 15-1

2LP-SQS-15.1

K/A #: 3.10.000.026.EA2.02

Source: North Anna - 65

Rev. 7

OBJECTIVE: 2 and 13

K/A IMPORTANCE: 2.9/3.6

Question 2-97-96

To ensure a flowpath for service water return to the Circulating Water System, interlocks are provided on which of the following?

A. ALL cooling tower pump suction valves CANNOT be CLOSED simultaneously.

B. ALL cooling tower pump discharge valves CANNOT be CLOSED simultaneously.

C. On the whole condenser, No more than ONE out of four condenser waterbox inlet valves can be CLOSED at any given time.

D. On one condenser half, No more than ONE out of two condenser waterbox outlet valves can be CLOSED at any given time.

ANSWER: D.

Source: New

REFERENCES: 2OM-31.2 P&L#18

Issue 4 Rev. 0

2LP-SQS-31.1

OBJECTIVE: 5

K/A #: 3.10.075.000.K1.01

K/A IMPORTANCE: 3.0/3.2

Question 2-97-97

Given the following:

- The Unit is in a refueling outage.
- Core on-load is almost complete.
- The refueling crew in the fuel handling building (FHB) is moving a fuel element through the weir gate that separates the spent fuel pool and the fuel transfer canal.
- The refueling SRO notices that cavity level is slowly DROPPING.

Based on the above information, the suspended fuel element should be…

A. lowered in the transfer canal and left on the FHB side.

B. placed in the reactor vessel.

C. returned to the SFP.

D. placed in the RCCA change fixture.

ANSWER: C.

Source: North Anna - 99

REFERENCES: 2OM-20.4.AAD

Issue 4 Rev. 0

2LP-SQS-20.1

OBJECTIVE: 9g

K/A #: 3.11.000.036.EA1.04

K/A IMPORTANCE: 3.1/3.7

Question 2-97-98

Which of the following procedure transitions should be made upon completion of E-3, "Steam Generator Tube Rupture" if the primary concern is to minimize offsite radiological releases and limit the contamination of the secondary plant?

A. ES-3.1, "Post-SGTR Cooldown Using Backfill"

B. ES-3.2, "Post-SGTR Cooldown Using Blowdown"

C. ES-3.3, "Post-SGTR Cooldown Using Steam Dump"

D. ECA-3.1, "SGTR With Loss Of Reactor Coolant - Subcooled Recovery Desired"

ANSWER: A. Source: M-LRT - 0009

REFERENCES: 2OM53-B.4.ES-3.1 pg. 4 Issue 1B Rev. 3

2LP-SQS-53A.1 OBJECTIVE: 6

K/A #: 3.11.000.059.EK3.01 K/A IMPORTANCE: 3.5/3.9

Question 2-97-99

During sampling of the PZR vapor space, the outside containment isolation valve [2SSR*AOV112A2] develops a severe packing leak. A HIGH radiation alarm on the Leak Collection Vent Radiation Monitor [2RMR*RQI301] has resulted.

This alarm will result in…

A. NO automatic actions. The operators must manually CLOSE the Normal Leak Collection Dampers [2HVS*201A&B] to terminate the release.

B. Normal Leak Collection Dampers [2HVS*201A&B) CLOSING and Filtered Leak Collection Dampers [2HVS*202A&B] OPENING.

C. Containment Purge Diverting Dampers [2HVR*MOD21&22] swapping to the Filtered Release Path.

D. Normal Exhaust Fans [2HVS*FN263A&B] STOPPING and the associated fan discharge dampers CLOSING.

ANSWER: B.

Source: New

REFERENCES: 2OM-43.5.B.3

Issue 4 Rev. 0

2LP-SQS-43.1

OBJECTIVE: 5

K/A #: 3.11.000.060.EA2.05

K/A IMPORTANCE: 3.7/4.2

Question 2-97-100

What indication is available to alert personnel that a CO2 discharge is imminent inside of a protected zone?

A. A red revolving light inside the zone.

B. A pre-discharge horn sounding inside the zone.

C. A wintergreen odorizer floods the zone prior to the discharge.

D. The announcement from Security over the Page Party System.

ANSWER: B.

Source: SQS - 1165

REFERENCES: 2OM.33.1.B

Issue 4 Rev. 2

2LP-SQS-33.1

OBJECTIVE: 4.d

K/A #: 3.11.000.067.G05

K/A IMPORTANCE: 3.4/3.8

Question 2-97-101

Technical Specification 3.4.8.1 - RCS Specific Activity, action statement requires the RCS to be cooled down to <500°F if the specific activity limits of the reactor coolant are exceeded. What is the bases for reducing Tavg to <500°F?

A. To prevent the release of activity should a S/G tube rupture since Tsat of the RCS is below the lift pressure of the S/G code safety valves.

B. To ensure additional iodine spiking will NOT occur due to the reduced thermal energy in the fuel rod gas volume.

C. To ensure the projected site boundary thyroid dose will be maintained less than the 10CFR part 20 limit following a postulated SGTR.

D. To prevent having to make a Protective Action Recommendation (PAR) should a SGTR concurrent with a Faulted S/G Outside Containment occur.

ANSWER: A.

Source: New

REFERENCES: TS 3.4.8 Bases pg. 4-6

Amendment No. - Original

2LP-SQS-TS

OBJECTIVE: 4

K/A #: 3.11.000.076.G04

K/A IMPORTANCE: 2.1/3.7

QUESTION: 046 (1.0)

Given the following:

- The Unit is in mode 6 for a refueling outage.
- Off-load of fuel is 55% complete and ongoing.
- Containment Purge and Exhaust is in service.
- I&C has just reported that the current HI setpoints for the Containment Purge Radiation Monitor [2HVR*RQI104A] was incorrectly set two decades HIGH.

What action should be directed based on this information?

A. Suspend core off-load until containment atmosphere grab samples can be obtained and double verified <MPC.

B. Suspend core off-load until the containment purge and exhaust valves are declared OPERABLE.

C. Continue core off-load and direct HP to perform continuous air monitoring of the containment.

D. Continue core off-load and verify purge exhaust directed through the Main Filter Bank.

ANSWER: B.

Source: North Anna - 46

REFERENCES: TS 3.9.9

Amendment No. Original

2LP-SQS-TS

OBJECTIVE: 1

K/f #: 3.11.029.000.G11

K/A IMPORTANCE: 2.8/3.5

The suction piping of the spent fuel pool cooling pumps [2FNC*P21A&B] has ruptured and CANNOT be isolated. Which of the following by design, is the lowest resulting fuel pool level that will result?

A. 10 feet above the spent fuel assemblies.

B. 23 feet above the spent fuel assemblies.

C. A level equal to the top of RCCA change fixture.

D. The spent fuel pool will completely drain.

ANSWER: A.

Source: R-SQS - 1103

REFERENCES: 2OM-20.1.B pg. 3

Issue 4 Rev. 1

2LP-SQS-20.1

OBJECTIVE: 1

K/A #: 3.11.033.000.K4.01

K/A IMPORTANCE: 2.9/3.2

Question 2-97-104

Which of the following manipulator crane features helps to prevent lifting a fuel assembly with excessive force?

A. Dillon load cell circuit.

B. Gripper interlock circuit.

C. Bridge - trolley interlock.

D. Slack cable limiting circuit.

ANSWER: A.

Source: R-LOT - 0206

REFERENCES: Refueling Manual

Issue Rev.

2LP-SQS-6.12

OBJECTIVE: 5.c

K/A #: 3.11.034.000.K6.01

K/A IMPORTANCE: 2.1/3.0

Question 2-97-105

During a Liquid Waste Discharge, flow control valve [2SGC-HCV100] is in manual and controlling flow at 30 gpm. A High Radiation Alarm is received on the Liquid Waste Process Effluent Radiation Monitor [2SGC-RQ100]. Which of the following explains the effect this Radiation Alarm will have on the Liquid Waste Discharge?

A. The discharge will be terminated due to the automatic CLOSURE of [2SGC-HCV100].

B. The discharge will continue, [2SGC-HCV100] will NOT automatically CLOSE while in manual.

C. The discharge will be terminated by diverting the discharge flowpath from Unit 1 cooling tower to the Steam Generator Blowdown Hold Tanks.

D. The discharge will continue for 30 seconds, if the High Radiation Alarm is still present, [2SGC-HCV100] will automatically CLOSE.

ANSWER: B.

Source: M-SQS - 0608

REFERENCES: 2OM-25.1.D Pg. 10

Issue 4 Rev. 0

2LP-SQS-17.1

OBJECTIVE: 5

K/A #: 3.11.068.000.A3.02

K/A IMPORTANCE: 3.6/3.6

Question 2-97-106

Which of the following describes the gaseous waste disposal system response if the rupture disc [2GWS-PSE126] on the gaseous waste surge tank [2GWS-TK21] were to rupture?

A. The Auxiliary Building Supply and Exhaust Fans will automatically STOP.

B. A flammable mixture of radioactive gases will form in the Unit 2 Auxiliary Building.

C. The release of gas to the environment will be terminated by trip valve [2GWS-AOV105].

D. The surge tank will relieve via relief valve [2GWS-RV101] to the Unit 1 waste gas relief header.

ANSWER: D.

Source: R-LOT - 0201

REFERENCES: 2OM-19.1.B pg. 2

Issue 4 Rev. 0

2LP-SQS-19.1

OBJECTIVE: 2

K/A #: 3.11.071.000.K4.01

K/A IMPORTANCE: 2.6/3.0

Question 2-97-107

Which of the following Control Room annunciators indicates that the Main Transformer fire protection system Deluge Valve [2FPW-STV212] has opened?

A. [A7-6B] MAIN TRANSFORMER GAS COMBUSTIBLES HIGH/INERTAIRE.

B. [A7-6C] MAIN TRANSFORMER THERMAL OVERLOAD.

C. [A7-6E] MAIN TRANSFORMER THERMAL SUDDEN PRESSURE RELAY OPERATION.

D. [A7-6G] MAIN TRANSFORMER GROUND.

ANSWER: C.

Source: New

REFERENCES: 2OM-35.4.ABD pg. 2 & 2OM-33.1D pg. 2

Issue 4/4 Rev. 1/2

2LP-SQS-33.1

OBJECTIVE: 4.d

K/A #: 3.11.086.000.A4.02

K/A IMPORTANCE: 3.5/3.5